Exercise 1 — Set of integers "$\mathbb{Z}$"

📖 **From the school book**

1 Put (✓) if the number is an integer :

a 7 ☐   b $\frac{2}{5}$ ☐   c − 100 ☐

d 0 ☐   e $\frac{8}{2}$ ☐   f − 15 ☐

g 3.2 ☐   h $2\frac{1}{3}$ ☐   i $|-4|$ ☐

2 Put the suitable sign "$\in , \notin , \subset$ or $\not\subset$" :

a − 3 ☐ $\mathbb{N}$ b $\{-5\}$ ☐ $\mathbb{Z}$

c 📖 Zero ☐ $\mathbb{Z}^+$ d $\{1 , -2\}$ ☐ $\mathbb{N}$

e $\mathbb{Z}^-$ ☐ $\mathbb{Z}$ f $\{-3 , \frac{7}{11}\}$ ☐ $\mathbb{Z}$ (Red Sea 2015)

g 📖 $\frac{13}{5}$ ☐ $\mathbb{Z}$ h 📖 $|-65|$ ☐ $\mathbb{Z}^-$

i 📖 $\mathbb{N}$ ☐ $\mathbb{Z}$ j $\{2 , 5 , \frac{3}{7}\}$ ☐ $\mathbb{Z}$

3 Complete :

(a) $|-5| = $ ··········   «El-Kalyoubia 2013»

(b) If $|x| = 5$, then $x = $ ·········· or ··········   «El-Gharbia 2012»

(c) $3 + |-3| = $ ··········   «Cairo 2014»

(d) $|-17| - 12 = $ ··········   «El-Monofia 2017»

(e) 📖 $\{15\}$ ·········· $\mathbb{Z}^-$

(f) $\mathbb{Z}^+ \cup \{0\} \cup \mathbb{Z}^- = $ ··········   «Suez 2015»

(g) 📖 $\mathbb{Z} = \mathbb{N} \cup$ ··········   «Luxor 2012»

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1 Lesson

h $\mathbb{Z}^+ \cap \mathbb{Z}^- = \dots\dots$ (El-Dakahlia 2017)

i 📖 $\mathbb{Z}^- \dots\dots \mathbb{N}$

j $\mathbb{Z} - \mathbb{N} = \dots\dots$ (El-Beheira 2014)

k $\mathbb{Z} - \mathbb{Z}^- = \dots\dots$ (Qena 2013)

l $\mathbb{Z}^+ \cup \{0\} = \dots\dots$ (El-Kalyoubia 2016)

m $\mathbb{Z}^+ \cup \dots\dots = \mathbb{N}$ (South Sinai 2013)

n $\mathbb{Z}^+ \cup \mathbb{N} = \dots\dots$ (El-Kalyoubia 2011)

o $\mathbb{Z} \cap \mathbb{N} = \dots\dots$ (El-Menia 2012)

p $\mathbb{N} - \mathbb{Z}^+ = \dots\dots$

q $\mathbb{N} - \mathbb{Z} = \dots\dots$ (Alexandria 2013)

r $\mathbb{Z} = \mathbb{Z}^+ \cup \mathbb{Z}^- \cup \dots\dots$ (El-Sharkia 2014)

s $\mathbb{Z}^- \cap \mathbb{N} = \dots\dots$ (Port Said 2016)

t 📖 The set of odd integers $\cup$ the set of even integers $= \dots\dots$

u The complement of $\mathbb{Z}^-$ with respect to $\mathbb{Z} = \dots\dots$

v The complement of $\mathbb{Z}^+$ with respect to $\mathbb{N} = \dots\dots$

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4 **Choose the correct answer :**

(a) $\{2\} \dots\dots \mathbb{Z}$ «Giza 2014» ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(b) $\frac{2}{7} \dots\dots \mathbb{Z}$ «Souhag 2015» ($\notin$ *or* $\in$ *or* $\subset$ *or* $\not\subset$)

(c) $|-9| \dots\dots \mathbb{Z}^+$ «El-Beheira 2017» ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(d) $\frac{6-6}{8} \dots\dots \mathbb{Z}$ «El-Monofia 2014» ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(e) $|-5| + 3 \dots\dots \mathbb{Z}$ «Alexandria 2016» ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(f) $|\frac{1}{3}| - |\frac{-1}{3}| \dots\dots \mathbb{Z}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

(g) $|-5| + |7| = \dots\dots$ «South Sinai 2014» (12 *or* 2 *or* -2 *or* -12)

(h) $|-3| + |-2| = \dots\dots$ «El-Kalyoubia 2011» (-5 *or* 5 *or* -1 *or* 1)

Unit One

i $|-2| + |2| =$ ·········· *(North Sinai 2017)* (zero **or** 1 **or** -4 **or** 4)

j If $b = |-7|$, then $b =$ ········· *(El-Menia 2011)* (-7 **or** 7 **or** 0 **or** 14)

k $\mathbb{Z}^+ \cap \mathbb{Z}^- =$ ·········· *(Souhag 2012)* ($\mathbb{Z}$ **or** $\mathbb{Z}^+$ **or** $\mathbb{Z}^-$ **or** $\varnothing$)

l $\mathbb{Z} - \mathbb{Z}^- =$ ········· *(El-Monofia 2011)* ($\mathbb{Z}^-$ **or** $\mathbb{Z}^+$ **or** $\mathbb{N}$ **or** {zero})

m $\mathbb{Z} - \mathbb{N} =$ ········· *(Matrouh 2017)* ($\mathbb{Z}^+$ **or** {0} **or** $\mathbb{Z}^-$ **or** 0)

n $\mathbb{Z}^+ \cup \{0\} =$ ········· *(El-Fayoum 2012)* ($\mathbb{Z}$ **or** $\mathbb{Z}^-$ **or** $\mathbb{N}$ **or** $\varnothing$)

o $\mathbb{Z}^+ \cup \{0\} \cup \mathbb{Z}^- =$ ········· *(The New Valley 2011)* ($\mathbb{N}$ **or** $\mathbb{Z}^+$ **or** $\varnothing$ **or** $\mathbb{Z}$)

p $\mathbb{N} \cup \mathbb{Z} =$ ········· *(El-Menia 2016)* ($\mathbb{Z}$ **or** $\mathbb{N}$ **or** $\mathbb{Z}^-$ **or** $\mathbb{Z}^+$)

q $\mathbb{Z} \cap \mathbb{N} =$ ········· *(Kafr El-Sheikh 2012)* ($\mathbb{Z}$ **or** $\mathbb{N}$ **or** $\mathbb{Z}^-$ **or** $\varnothing$)

r $\mathbb{N} \cup \mathbb{Z}^- =$ ········· *(Assiut 2015)* ($\mathbb{Z}^-$ **or** $\mathbb{Z}^+$ **or** $\mathbb{Z}$ **or** $\mathbb{N}$)

s $\mathbb{Z}^+ - \mathbb{Z}^- =$ ········· *(Aswan 2013)* ($\mathbb{Z}^+$ **or** $\varnothing$ **or** $\mathbb{N}$ **or** {0})

t If $X \subset \{2, -3\} \cap \{5, -3\}$, then $X =$ ········· *(Giza 2011)*

({2} **or** {−3} **or** {−5} **or** {5})

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5 Write an integer to represent each situation :

a A temperature is 12 C° below zero. (··········)

b She's diving 10 m. below sea level. (··········)

c A temperature is 5 C° above zero. (··········)

d 📖 Ahmed withdraws 6000 pounds from his bank account. (··········)

e The tree is 4 m. high. (··········)

f 3 steps forward. (··········)

g 80 ft. above sea level. (··········)

h A bank deposit of L.E. 750 (··········)

LESSON 1

i A loss of L.E. 20 (.........)

j A gain of 7 kilograms. (.........)

k A profit of L.E. 100 (.........)

l A weight loss of 6 kg. (.........)

m A decrease of L.E. 200 (.........)

6 📖 Complete the following using one of the words (positive - negative - zero) :

a Moving forwards is represented by .... numbers , while moving backwards is represented by .... numbers.

b Moving to the right is represented by .... numbers , while moving to the left is represented by .... numbers.

c Lowering than sea level is represented by .... numbers , height above sea level is represented by .... numbers.

d Sea level is represented by the number ....

7 Represent each of the following on the number line :

a $3 , -4 , 1 , -2$

b $-3 , 0 , 2 , 1 , -6 , 5$

c 📖 $6 , -3 , 0 , -1 , 3 , 5$

d $-4 , -5 , -6 , \cdots$

e $-2 , -1 , 0 , 1 , 2$

f $-1 , 0 , 1 , \cdots$

8 Write the opposite (inverse) of each integer :

a -3

b 12

c 0

d -195

e $|-34|$

f $-|-8|$

(18)

9 Represent each number and its inverse on the number line :

a 3

b 📖 – 4

c 0

d 📖 – 99

10 Find :

a | – 7 |

b | 2 |

c | 0 |

d | – 10 |

e | – 21 |

f | – 100 |

11 Find each of the following :

a | – 3 | + | 2 |

b | 5 | – | 4 |

c | – 2 | + | – 13 |

d | – 100 | – | – 50 |

e | – 5 | + 7   *(El-Menia 2016)*

f | – 12 | – | 12 |

g | 0 | + | 5 |

h | 0 | + | – 7 |

i | – 2 | + 2   *(Cairo 2016)*

j | – 5 | – 5

12 Find each of the following :

a | – 3 | × | – 5 |

b | – 10 | × | 2 |

c | – 30 | ÷ | – 5 |

d | – 4 | × | 7 |

e | 0 | × | – 3 |

f 8 × | – 11 |

13 Find the value of x :

a | x | = 5

b | x | = 12

c | x | = 0

d | – 4 | = x

e | 3 | = x

f | – 101 | = x

(19)

LESSON 1

14 📖 Mark (true) or (false) and give the reason :

a Zero $\in \mathbb{Z}^-$ (.........)

Because : ....

b $\varnothing = \mathbb{Z}^- \cap \mathbb{Z}$ (.........)

Because : ....

c $\mathbb{Z}^+ \cup \mathbb{N} = \mathbb{Z}^+$ (.........)

Because : ....

d $\{-17\} \in \mathbb{Z}$ (.........)

Because : ....

e $\mathbb{Z}^+$ is the set of counting numbers.   (.........)

Because : ....

f Zero is the smallest positive number.   (.........)

Because : ....

15 In each of the following , find the value of x to get a true statement :

a $-4 \in \{7 , x , -3\}$

b 📖 $-5 \in \{-1 , 0 , -3 , x\}$

c $x \in \{-2\}$

d 📖 $x \in \{2 , 5 , -3\} \cap \{5 , -2 , -3\}$

e 📖 $\{2 , x\} \cup \{-4 , 0 , 4\} = \{0 , -2 , 2 , -4 , 4\}$

f $|-5| \notin \{x , -5 , 3\}$

(20)

Exercise 2

Ordering and comparing integers

1 Put [< , > or =] :

a $3 \boxed{} -3$

b $4 \boxed{} 3$

c $-3 \boxed{} -4$

d $-8 \boxed{} 4$

e $0 \boxed{} -1$

f $-2 \boxed{} 0$

g $-12 \boxed{} -3$

h 📖 $3 \boxed{} -6$

i $|-4| \boxed{} 2$

j $|-4| \boxed{} |0|$

k $8 \boxed{} |-8|$

l 📖 $|-13| \boxed{} 3$

m $-15 \boxed{} |-2|$

n $-6 \boxed{} -|-3|$

o 📖 $-|-4| \boxed{} 2$

p 📖 $3 + |-3| \boxed{} 8$

q $|-9| - |5| \boxed{} |-4|$

r $|-7| \boxed{} -7$

2 Complete the following :

a The number ········· is neither positive nor negative.

b The smallest positive integer is ········· and the greatest negative integer

is ········· *(Kafr El-Sheikh 2017)*

c The smallest non-negative integer is ········· *(Damietta 2016)*

d The largest non-positive integer is ·········

e The set of integers between −3 and 2 = ········· *(El-Menia 2011)*

f The set of integers less than 1 and more than −4 is { ········· } *(Giza 2013)*

LESSON 2

3 Choose the correct answer :

a The smallest positive number is ········ *(Beni Suef 2015)*

(zero *or* 1 *or* 2 *or* 3)

b − 7 ········ − | − 9 | *(Damietta 2013)* (> *or* = *or* < *or* ≤)

c (− 4) ········ | − 4 | *(South Sinai 2013)* (> *or* < *or* = *or* ≥)

d An integer included between − 2 and 3 is ········ *(Giza 2017)*

(3 *or* − 3 *or* − 4 *or* − 1)

e The greatest negative integer is ········ *(El-Kalyoubia 2011)*

(0 *or* − 1 *or* − 100 *or* 1)

f The integer which comes just before the number − 5 is ········

(Damietta 2011) (− 6 *or* − 4 *or* 4 *or* 6)

g The integer which comes just next the number 23 is ········

(El-Sharkia 2014) (25 *or* 22 *or* 23 *or* 24)

h The number of integers between − 2 and 2 = ········ *(El-Beheira 2012)*

(2 *or* 3 *or* 4 *or* 5)

4 Arrange in an ascending order each of the following :

a 1 , − 5 , − 1 and 3 *(El-Sharkia 2014)*

b − 22 , 11 , − 11 , 0 and 7

c − 7 , − 9 , − 4 and − 1

d − 3 , 5 , 2 , − 7 , 10 and − 6

e 8 , − 62 , − 19 , − 42 and 0 *(Beni Suef 2011)*

f − 9 , 17 , | − 9 | , − 15 and 16 *(Alexandria 2016)*

g − 8 , 12 , | − 8 | , − 15 and 19 *(Suez 2012)*

h 📖 6 , − 60 , 2 , − 17 , − 22 and 0

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5 Arrange in a descending order each of the following :

a – 9 , 0 , 7 and – 15 *(Red Sea 2013)*

b 8 , – 13 , – 19 , 0 and – 15

c – 28 , – 35 , 33 , – 37 and 2

d 📖 1 , – 11 , 3 , – 1 , – 8 and 5

6 Which of the following sets of integers is written from the smallest to the greatest ?

a 0 , 14 , – 15 , 16 , – 17 , – 19

b 16 , 14 , 0 , – 15 , – 17 , – 19

c – 19 , – 17 , – 15 , 0 , 14 , 16

d None of the previous.

7 Which of the following sets of integers is written from the greatest to the smallest ?

a 28 , 19 , 0 , – 21 , – 36 , – 39

b – 49 , – 38 , 0 , 22 , 27 , 30

c – 52 , – 47 , – 40 , 0 , 16 , 20

d None of the previous.

8 📖 Write the previous integer and the next integer of each of the following integers :

a – 9

b 13

c 23

d zero

9 📖 Write the integers between each two integers of the following :

a – 4 , 2

b – 1 , 5

c – 7 , 0

10 Write, using the listing method each of the following sets :

a 📖 The set of integers greater than – 2

b The set of integers smaller than 0

c The set of integers greater than – 3 and smaller than 2

d 📖 The set of integers between – 4 and 3 *(Matrouh 2013)*

e 📖 The set of negative integers whose absolute value of each is greater than 4

(27)

LESSON 2

f The set of non-negative integers.

g The set of non-positive even integers.

h 📖 X = { $x : x \in \mathbb{Z}$, $x \leq -2$ }

i X = { $x : x \in \mathbb{Z}$, $-1 < x < 1$ }

11 Complete the following :

a $-5, -4, -3,$ .... , ... , ...

b $3, 2, 1,$ .... , ... , ...

c 📖 $-7, -6, -5,$ .... , ... , ...

d $-2, -4, -6,$ .... , ... , ...

e 📖 $-2, 0, 2, 4,$ .... , ... , ...

f $-25, -20, -15,$ .... , ... , ...

g 📖 $-50, -40, -30,$ .... , ... , ...

h $9, 7, 5,$ .... , ... , ...

12 Write the letter that represents the integer on the number line :

```
A   B   C   D   E   F   G   H   I   J   K   L   M   N   O   P   Q
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
-8                              0                               8
```

a 7

b -5

c -2

d 1

e 5

f $|-1|$

28
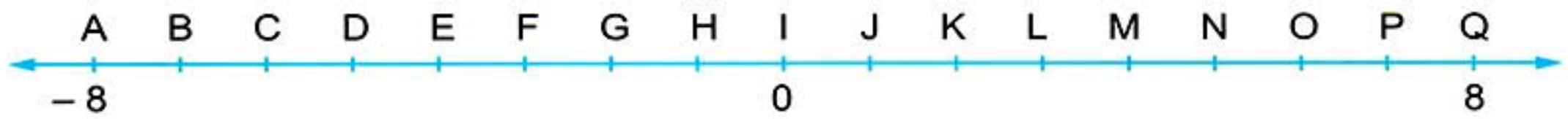
13 Which point corresponds to the integer ?

| E | | D | G | | B | | F | | A | | C |

−10 −8 −6 −4 −2 0 2 4 6 8 10
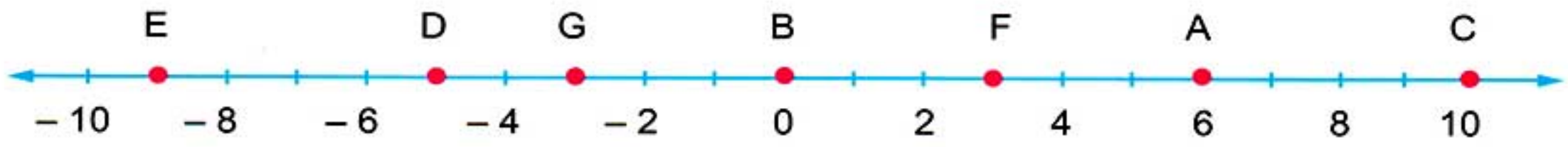
a 10 **b** − 9 **c** − 3

d 3 **e** − 5 **f** 0

14 Use the following table to answer the following questions :

City	Highest temperature	Lowest temperature
New York	8	− 2
Paris	3	− 5
Cairo	16	8
Mosco	− 5	− 15
London	5	− 4
Brazil	10	3

a Order the highest temperatures of all the cities from the greatest to the smallest.

b Order the lowest temperatures of all the cities from the smallest to the greatest.

15 Solve the following :

a A diver is at − 5 m. and a balloon is at 5 m. Which is closer to sea level ?

b A helicopter is at an altitude of 1000 ft. , and a diving bell is at − 750 ft. Which is further from sea level ?

(29)

Exercise **3**

Adding and subtracting integers

📖 From the school book

1 Use the number line to find :

a 2 + 4

−1 0 1 2 3 4 5 6

b − 6 + 4

−7 −6 −5 −4 −3 −2 −1 0 1 2

c − 3 + (− 4)

−7 −6 −5 −4 −3 −2 −1 0 1

d 6 + (− 7)
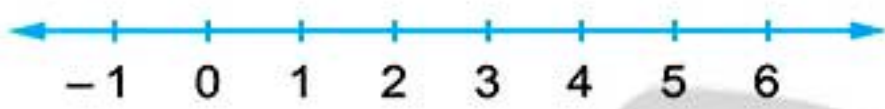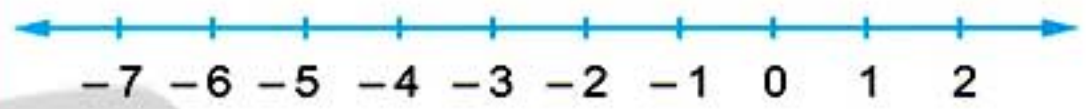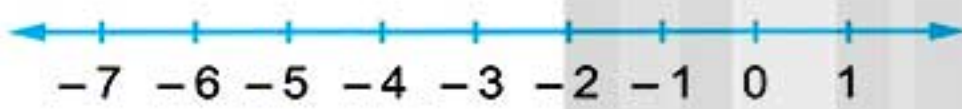
−2 −1 0 1 2 3 4 5 6 7
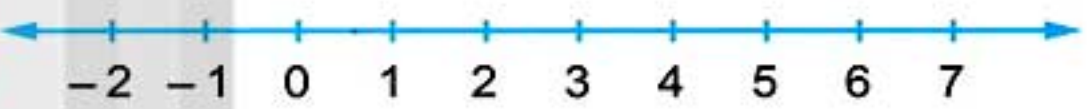
2 Use the number line to find :

a 5 + 2

b 4 + (− 3)

c − 4 + (− 2)

d − 7 + 4

e 8 − 4

f 5 − (− 3)

g 📖 − 3 − 3

h − 4 + 4

i − 10 + 2

3 Find the result of each of the following :

a 4 + 2

b (− 2) + (− 1)

c − 5 + 9

d 9 + (− 8)

e 0 + (− 5)

f 18 + (− 18)

g − 6 + 0

h − 48 + 34

i − 10 + (− 10)

4 Find the result of each of the following :

a 7 − 5

b 3 − 9

c − 7 − 3

d 19 − (− 11) *(Giza 2013)*

e − 3 − (− 4)

f − 9 − 8

g 0 − 7

h 0 − (− 3)

i − 5 − 0

j − 73 − (− 73)

k 33 − |− 11|

l |− 14| − |− 28|

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Unit One

5 Choose the correct answer :

a The additive identity in $\mathbb{Z}$ is ·········   *(South Sinai 2011)*

(0   *or*   1   *or*   − 1   *or*   2)

b $15 + 8 - 15 = $ ·········   *(Giza 2015)* (− 15   *or*   8   *or*   15   *or*   23)

c $3 - |-3| = $ ·········   *(El-Gharbia 2017)* (0   *or*   1   *or*   3   *or*   6)

d $|\frac{5-8}{3}| = $ ·········   *(El-Gharbia 2013)* (1   *or*   6   *or*   − 6   *or*   − 2)

e $|-5| + $ ········· $= 0$ *(El-Dakahlia 2011)* (− 5   *or*   5   *or*   0   *or*   1)

f The additive inverse of (-5) is ·········   *(Beni Suef 2011)*

(− 10   *or*   5   *or*   0   *or*   − 5)

g $4 + (-6) > $ ·········   *(Ismailia 2011)* (2   *or*   0   *or*   − 2   *or*   − 4)

h If $X = -1$, $Y = 2$, then the value of $X + Y = $ ·········   *(Beni Suef 2016)*

(2   *or*   3   *or*   1   *or*   − 1)

6 Write the property used in each of the following :

a $-5 + 3 = 3 + (-5)$ (··················)

b $6 + (-6) = 0$ (··················)

c $0 + (-7) = -7$ (··················)

d $(-10 + 5) + 3 = -10 + (5 + 3)$ (··················)

e $-a + a = 0$ (··················)

7 Complete each of the following :

a $4 + (-3) = (-3) + $ ········· | **b** $5 + $ ········· $= 0$

c $(-7) + $ ········· $= 0$ | **d** $(-8) + $ ········· $= (-8)$

e $6 + (-6) = $ ·········   *(South Sinai 2011)* | **f** $2 - (-3) = $ ·········   *(Qena 2014)*

g $|-17| - 12 = $ ·········   *(El-Monofia 2017)* | **h** $0 + $ ········· $= |-7|$

i $-2 + ($ ········· $+ 5) = -2$ | **j** $(5 + (-8)) + 7 = 5 + ($ ········· $+ 7)$

LESSON 3

k The additive inverse of 8 is ·········

l The additive inverse of (– 4) is ········· *(Ismailia 2014)*

m The additive inverse of | – 6 | is ·········

n The additive inverse of zero is ········· *(Souhag 2012)*

o The additive identity element in $\mathbb{Z}$ is ········· *(Souhag 2015)*

p The result of subtracting 7 from (– 2) is ·········

q The result of subtracting – 5 from 3 is ·········

r If a + b = b + c , then c = ········· | s If a + (– 3) = b + a , then b = ·········

t If a + b = b , then a = ········· | u If a + b = 0 , then a is ·········

8 Find the value of (n) in each of the following :

a – 8 + 0 = n | b – 6 + n = – 6

c n + 6 = 0 | d (– 8) + (– 4) = n

e 5 + n = 8 | f – 6 + n = – 9

g 27 + (– 27) = n | h n + 12 = 7

9 Use the properties of addition in $\mathbb{Z}$ to find :

a – 5 + (– 6) + 5 | b 10 + (– 5) + (– 2)

c – 7 + 2 + (– 13) | d (– 17) + 19 + 17 *(Kafr El-Sheikh 2016)*

e 15 + (– 3) + 25 | f 5 + (– 3) + 7 + (– 9)

g 25 + (– 8) + (– 25) + 7 *(El-Monofia 2013)*

h 55 + (– 255) + 45 + 225

i – 74 + 65 + 74 + (– 65) *(El-Beheira 2015)*

j 113 – 120 + 17 *(Red Sea 2011)*

k 📖 2015 + 180 + (− 1015)

l 63 + 54 + 37 + 46

(Giza 2012)

10 Find each of the following :

a 3 + 7 + 6

b (− 6) + (− 2) + (− 1)

c − 3 + 6 + (− 2)

d 4 − 7 − 5

e − 3 + 7 − 5

f − 17 − 13 + 10

g − 6 − (− 3) − 5

h − 9 + 7 − 3

i − 2 + 5 − (− 3) + 1

j − 10 − 4 + (− 3) − (− 6)

k (− 3 + 5) − (− 6)

l − 9 − (4 − 7)

11 Evaluate each expression for t = − 12

a 45 + t

b − 12 + t + 24

c t + (− 21)

d $t + |− 8| + 5$

12 If a = 3 , b = − 4 and c = − 2 , then find the value of :

a a + b

b b + c

c a − b

d b − c

e a + b + c

f a − b + c

g − c + a − b

h (a + c) − b

13 📖 Check the property of closure of the addition and subtraction on the following sets of numbers :

a X = {− 1 , 0 , 1}

b Y = {− 2 , − 1 , 0 , 1 , 2}

(43)

LESSON 3

14 📖 Temperature is recorded in St. Catherine – 3°C at three o'clock after midnight , while it is recorded 11°C in the afternoon.

Calculate the increase in temperature.

15 The temperature on Sunday morning was – 2°C , the temperature dropped 7°C by Monday and then rose 5°C by Tuesday.

What was the temperature on Tuesday ?

16 The temperature of the North polar water layer is – 1°C, the temperature rises 5°C in the North Atlantic deep water layer.

What is the temperature of that layer ?
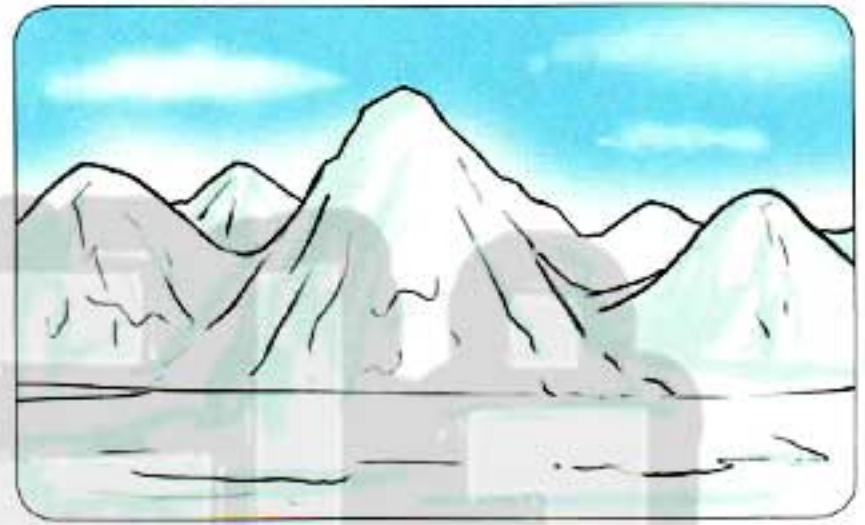
17 📖 A submarine at a depth of 90 metres below sea level. It rose 60 metres.

Use the appropriate calculation to calculate the new depth of the submarine.

18 📖 Ramy deposited a sum of money amounting to L.E. 6220 , then he withdrew an amount of L.E. 1211 , and then he deposited an another amount of L.E. 2110 How much is the balance of Ramy in the bank ?

(44)

Exercise 4

Multiplying and dividing integers

📖 From the school book

1 State whether the product is positive , negative or 0 :

a 8×5

b $(-3) \times (-9)$

c -6×7

d $0 \times (-5)$

2 State whether the quotient is positive , negative or 0 :

a $(-15) \div (-5)$

b $24 \div (-3)$

c $0 \div 8$

d $144 \div 16$

3 Multiply :

a 3×5

b -6×2

c $(-125) \times (-4)$ *(El-Menia 2015)*

d $0 \times (-10)$

e $9 \times (-1)$

f 📖 -9×7

g 📖 $(-131) \times (-3)$

h $200 \times (-12)$

i 📖 $-(-6) \times (-2)$

j $(-5) \times |-4|$ *(Ismailia 2016)*

k $-|10| \times |-3|$

l $|0| \times |4|$

4 Divide :

a $8 \div 2$

b $-64 \div 8$

c $49 \div (-7)$

d $(-36) \div (-4)$ *(Aswan 2014)*

e $0 \div 10$

f $77 \div (-11)$

g $-100 \div 25$

h $-\dfrac{18}{2}$

i $(-18) \div (-3)$ *(El-Monofia 2012)*

j $\dfrac{18}{-6}$

k $|-45| \div |-5|$

l $-|42| \div 6$

(53)

LESSON 4

5 Write the property of multiplication in the set $\mathbb{Z}$ in each of the following :

a $-12 \times 1 = -12$ (.....................)

b $-5 \times (9 \times 7) = (-5 \times 9) \times 7$ (.....................)

c $5 \times (-2) = (-2) \times 5$ (.....................)

d $(-2 \times 6) + (-2 \times 9) = -2 \times (6 + 9)$ (.....................)

6 Find the value of (X) in each of the following :

a $-8 \times 4 = x \times -8$

b $-16 \times x = -16$

c $x \times (9 + 5) = (-4 \times 9) + (-4 \times 5)$

d $-7 \times x = 0$

e 📖 $x \times (5 \times (-13)) = (-9 \times 5) \times (-13)$

f $(-8) \times (-3) = x$

g $-9 \div 3 = x$

h 📖 $8 \times x = -48$

i $-3x = 27$

j 📖 $5x = 45$

k 📖 $x \times 9 = -45$

l $-18 \div x = -9$

7 Complete :

a The additive neutral element in $\mathbb{Z}$ is ········· , while the multiplicative neutral element in $\mathbb{Z}$ is ·········

b The sum of two negative integers is a ········· integer , while the product of two negative integers is a ········· integer.

c The quotient of two integers having different signs when the division operation is possible in $\mathbb{Z}$ is a ········· integer.

d $5 \times$ ········· $= 0$

e $3 \times (-7) =$ ········· (Matrouh 2013)

f $|-24| \div (-8) =$ ········· (Ismailia 2011)

g $5 \times (-|42|) =$ ········· (Port Said 2015)

h $-(-12) \times (-5) =$ ·········

i $-4 \times [3 + (-1)] =$ ········· (Assiut 2016)

j $[9 + (-5)] \times |-11| =$ ········· (The New Valley 2017)

k $-7 \times$ ········· $= -56$

(54)

l .... $\times 9 = -3 \times 21$

m If $a = 3$, $b = -2$, then the value of $3ab =$ .... *(Kafr El-Sheikh 2016)*

n If $x = |-12|$, $y = -3$, then $x \div y =$ .... *(Giza 2017)*

o $A \times (B + C) =$ .... $+ A \times C$

p If $a \times b = a$, and $a \neq 0$, then $b =$ ....

q If $a \div b = a$, and $a \neq 0$, then $b =$ ....

r If $a \div b = 1$, then $b =$ ....

s If $a \div b = -1$, then b is the .... of a

8 Choose the correct answer :

a $6 \times (-3) =$ .... *(El-Menia 2012)* (18 **or** -18 **or** 9 **or** -9)

b $(-8) \div (-4) =$ .... *(El-Menia 2011)* (2 **or** -2 **or** 4 **or** 32)

c $72 \div (-6) =$ .... *(El-Sharkia 2011)* (-12 **or** 12 **or** 6 **or** -6)

d If $x = |-2|$, $y = -3$, then $xy =$ .... *(Giza 2016)*

(-5 **or** 5 **or** 6 **or** -6)

e $[8 + (-3)] \times (-3) =$ .... *(El-Monofia 2013)*

(15 **or** -15 **or** 72 **or** -72)

f Zero $\div (-3) =$ .... ($\frac{1}{3}$ **or** -3 **or** 1 **or** zero)

g Zero $\times (-1) \times (-2) \times (-3) =$ .... *(El-Gharbia 2014)*

(0 **or** -6 **or** -5 **or** 6)

h $6 \div 3 \times 2 - 1 =$ .... (1 **or** 2 **or** 3 **or** 4)

i If n is a negative integer , which of the following is the smallest ?

(Red Sea 2016) ($3 + n$ **or** $3n$ **or** $\frac{-3}{n}$ **or** $3 - n$)

j If $a + b =$ zero where $a \neq b$, then $a \times b$ .... zero *(Beni Suef 2017)*

($=$ **or** $>$ **or** $<$ **or** $\geq$)

9 Use the properties of multiplication of integers to find :

a $5 \times 17 \times 2$ **b** $50 \times (-45) \times 2$

c $4 \times (-5) \times 3 \times (-2)$ **d** $(-2) \times (-3) \times 5 \times (-1)$

e $4 \times (-16) \times 25$ **f** $8 \times 77 \times (-125)$

(55)

LESSON **4**

10 Use the distributive property to find the result of each of the following :

a $3 \times (-2) + 3 \times 5$

b $75 \times 37 + 75 \times 63$ *(El-Dakahlia 2017)*

c $(-5) \times (-6) + 2 \times (-6)$

d $147 \times 69 - 47 \times 69$

e $112 \times 17 + 112 \times (-17)$ *(Souhag 2012)*

f $(-35) \times (-42) + (-35) \times 52$

g $32 \times 18 - 32 \times 34 + 32 \times 17$

h $45 \times (-16) + (-47) \times (-16) + (-16)$

i $(-3) \times 4 - (-3) \times 5 - 3$

11 Use the distributive property to find :

a 26×101

b 64×99

c 32×98

d 72×111

12 Find the result of each of the following :

a $(-5) \times (3 + 7)$

b $12 \times (5 - 9)$

c $[8 + (-5)] \times 6$ *(El-Kalyoubia 2011)*

d $[5 + (-3)] \times (-11)$ *(Damietta 2013)*

e $6 \times (-6 + 0)$ *(Damietta 2011)*

f $(-7) \times (6 - 2 - 8)$

g $(5 + 3 - 8) \times (-4)$

h $(-5 + 3) \div 2$

i $45 \div [3 - (-6)]$

j $[25 \times (-2)] \div (-5)$

13 If $x = 2$, $y = 1$ and $z = 5$, then find the value of : $3x - 2y + z$

(Kafr El-Sheikh 2011)

14 Find the value of : $x - 2y + 4$, when $x = 8$ and $y = -2$ *(Cairo 2011)*

15 If $x = 3$, $y = -1$ and $z = -2$, calculate the value of : $(2x \div y) \times 3z$

(El-Dakahlia 2011)

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Exercise 10

Distance between two points in the coordinates plane

1 From the following figure, complete :
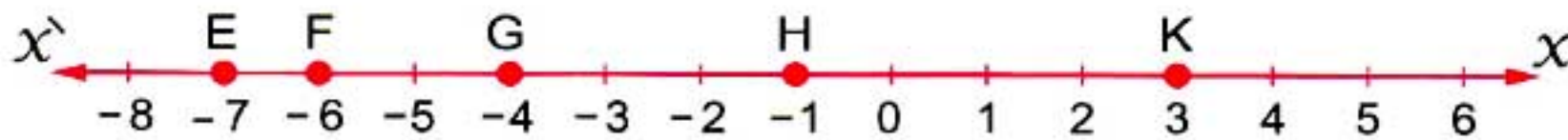
a EF = ...

b EG = ...

c EH = ...

d EK = ...

e FG = ...

f FH = ...

g FK = ...

h GK = ...

i HK = ...

2 In the opposite coordinate plane :

Locate the points A (0 , 4) ,

B (2 , 1) and C (− 2 , 1) , then
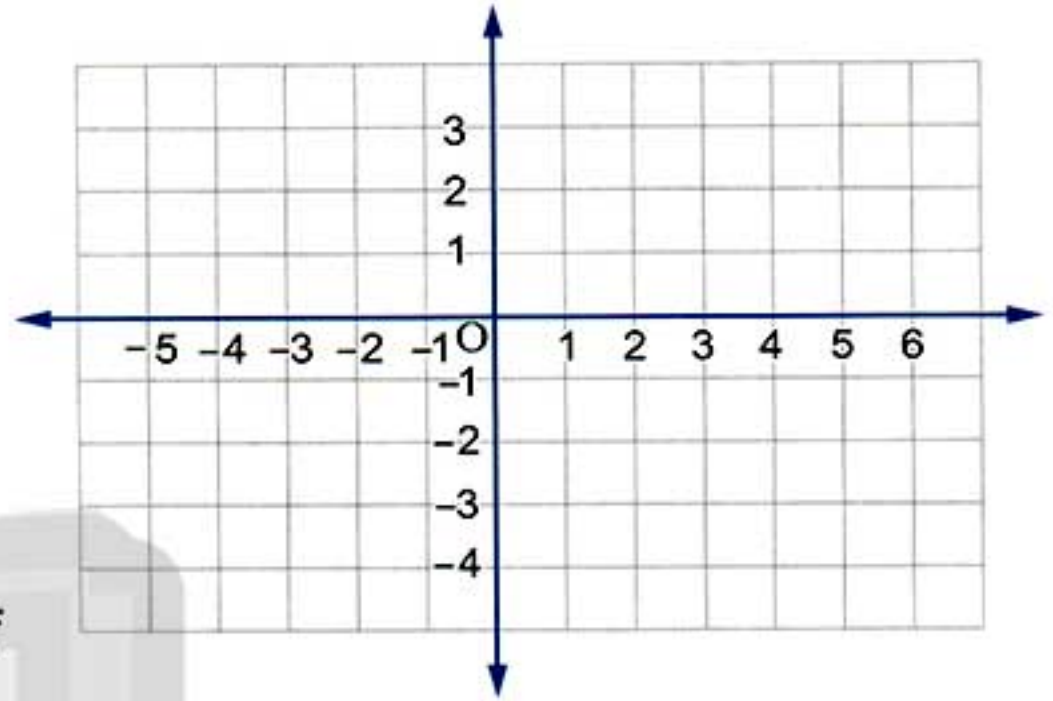
Find the length of $\overline{BC}$ *(Giza 2017)*
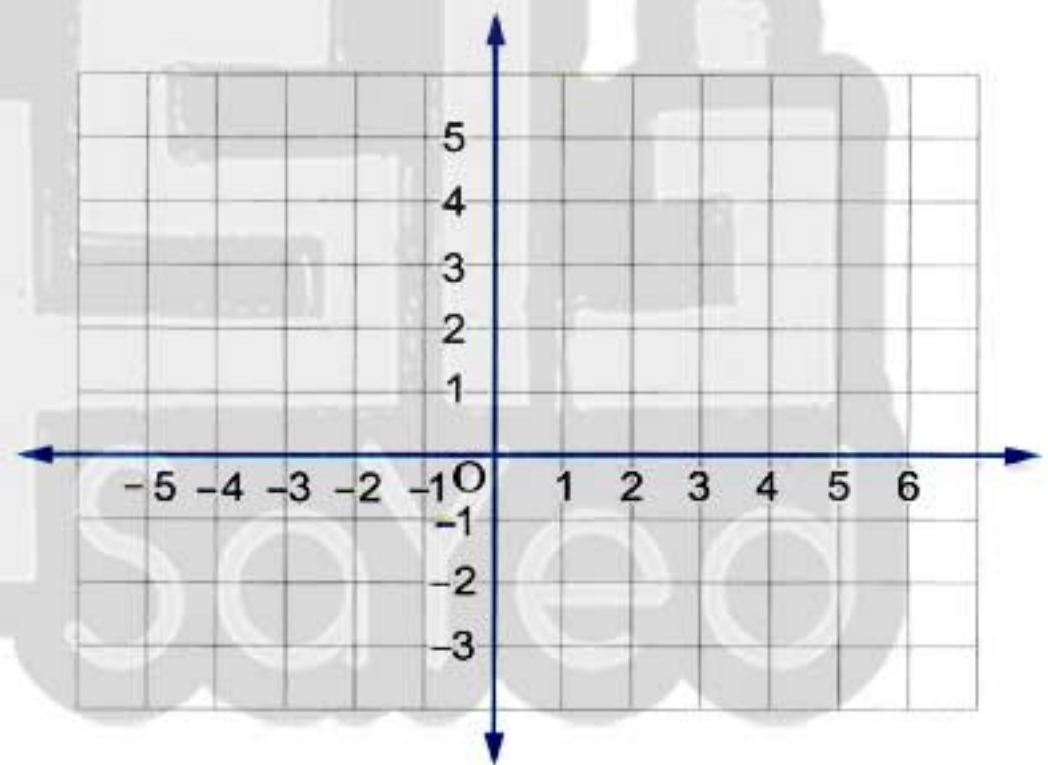
3 In the opposite coordinate plane :

a Determine the position of the following points : A (− 3 , − 3) , B (− 3 , 2) , C (5 , 2) and D (5 , − 3) and mention the name of the shape ABCD

b Find the perimeter and the area of the shape ABCD

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LESSON

1
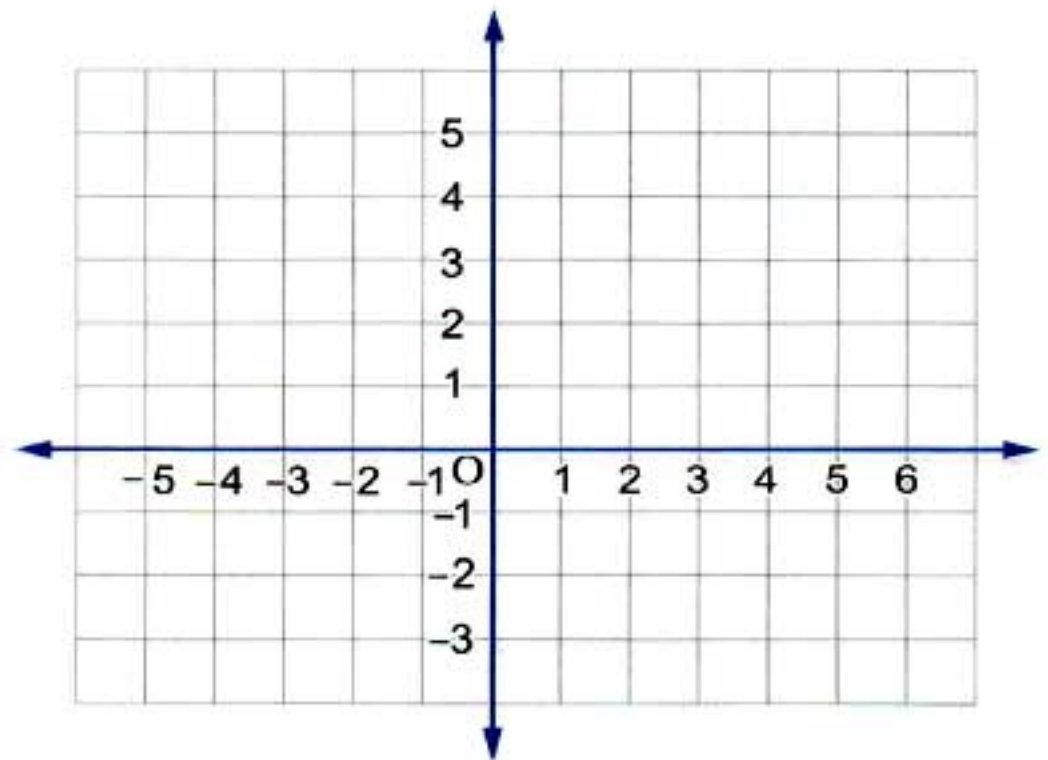
4 In the opposite coordinate plane :

a Determine the position of the following points : A $(-4 , -4)$, B $(2 , -4)$, C $(2 , 2)$ and D $(-4 , 2)$ and mention the name of the shape ABCD

b Find the perimeter and the area of the shape ABCD

c Determine whether the shape is symmetric or not ? Why ?

5 In the opposite coordinate plane :

a Determine the position of the following points : L $(-1 , 1)$, M $(1 , 1)$, N $(1 , 8)$ and E $(-1 , 8)$

b Find the perimeter and the area of the shape LMNE

c Determine whether the shape is symmetric or not ? Why ?

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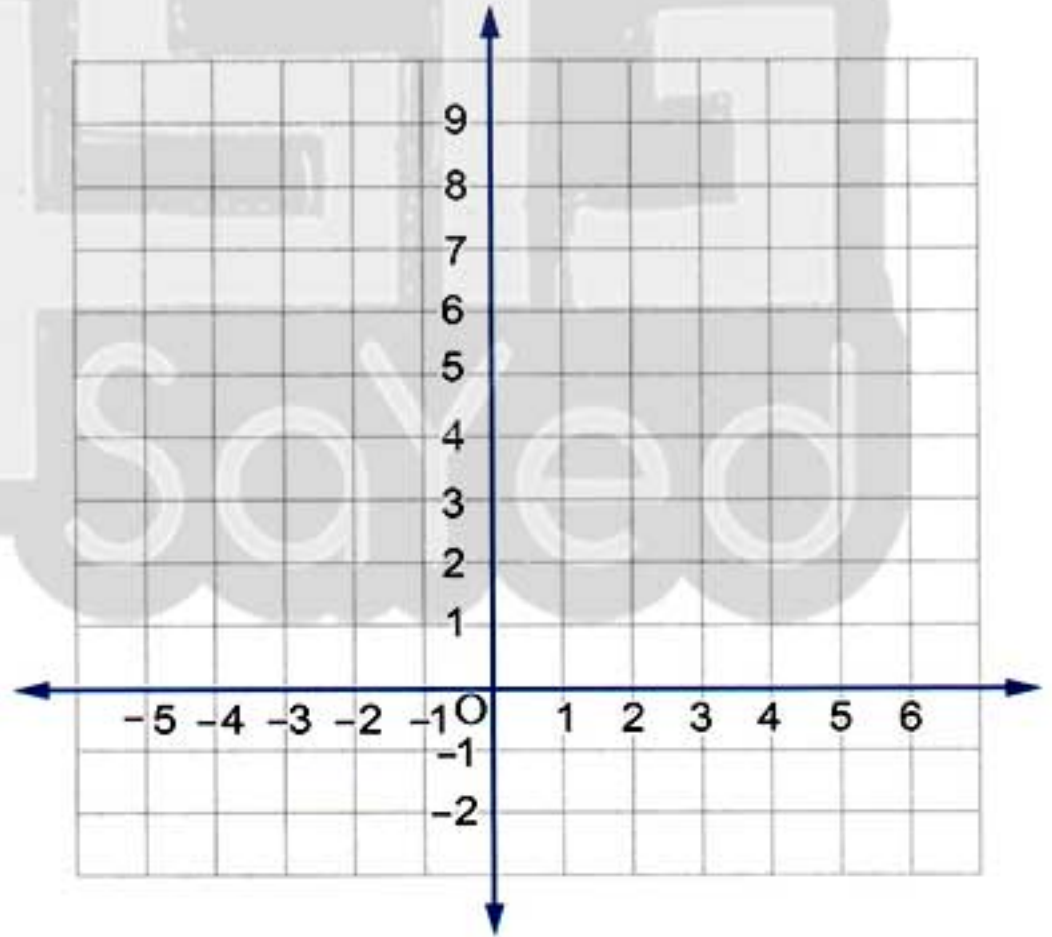
6 In the opposite coordinate plane :

Determine the position of the
following points :

A $(-1, -4)$, B $(-1, 3)$ and

C $(5, -4)$, then find :

a The length of each of $\overline{AB}$ and $\overline{AC}$

b The type of the triangle ABC

with respect to its sides and angles.
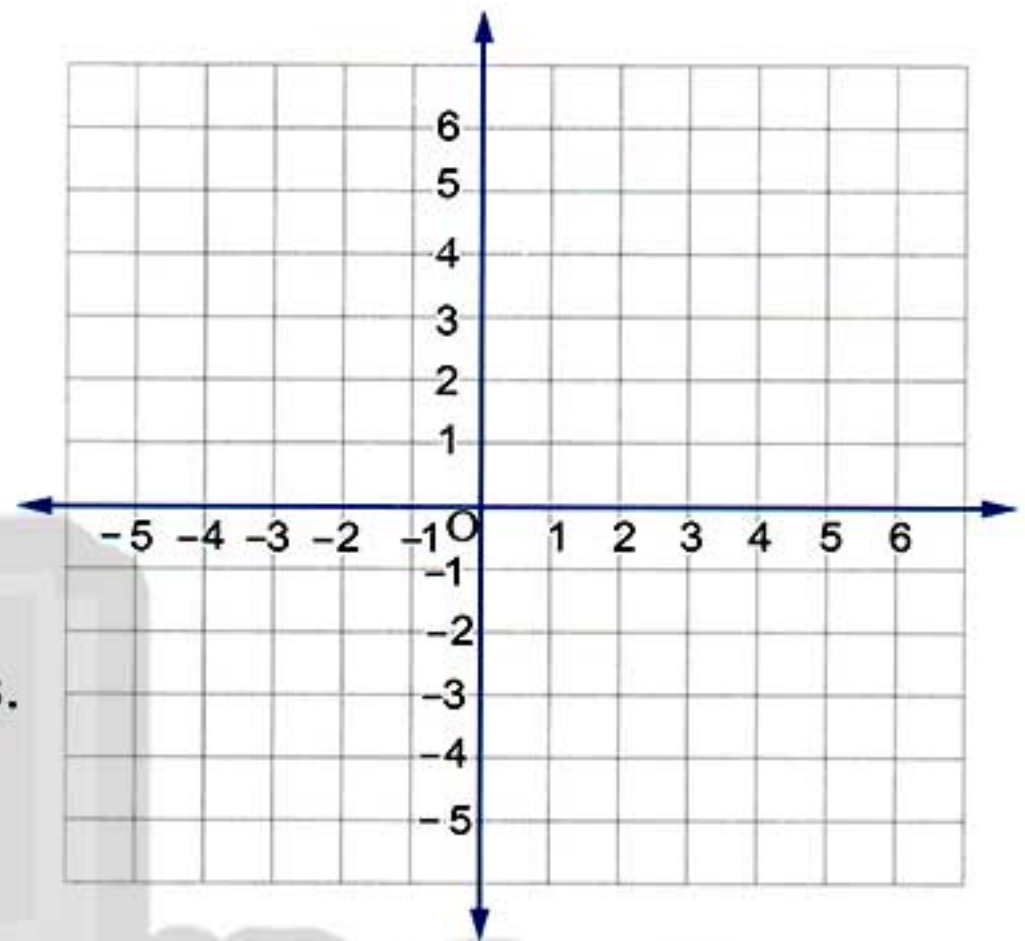
c The area of $\triangle$ ABC

7 In the opposite coordinate plane :

EFGH is a rectangle , complete :

a The coordinates of the points

E (········ , ········) , F (········ , ········) ,

G (········ , ········) and H (········ , ········)

b EF = ········· units

, FG = ········· units.

, GH = ········· units

, HE = ········· units.

c The area of the rectangle = ········· square units.

LESSON

1
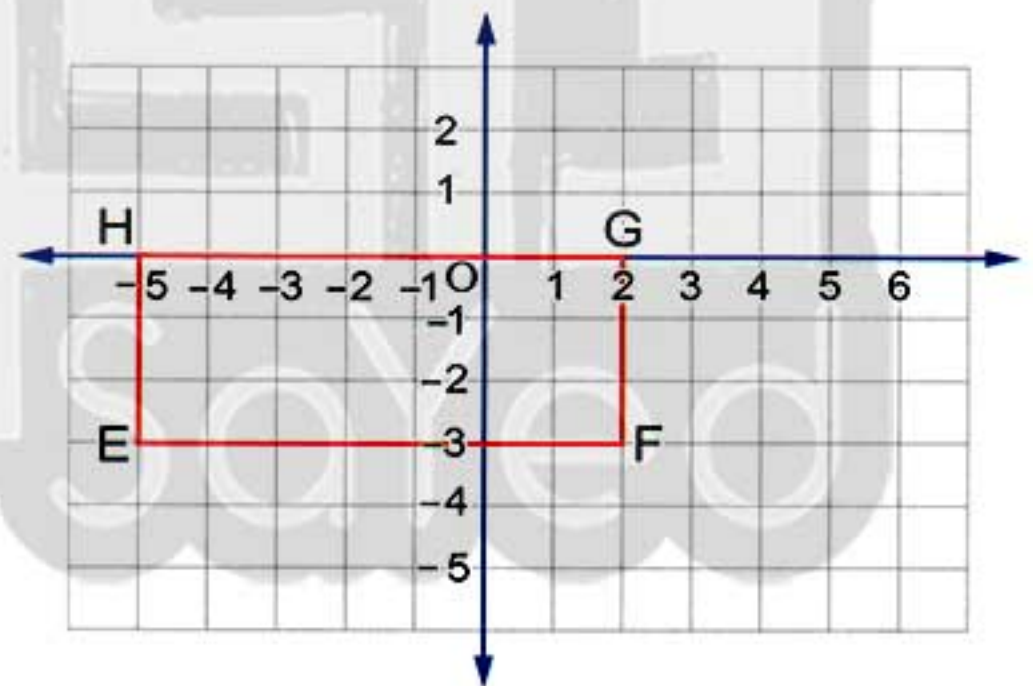
8 📖 **In the opposite coordinate plane :**

ABCD is a rhombus.

a Complete the coordinates of the following points :

A (·········· , ··········)

, B (·········· , ··········)

, C (·········· , ··········)

and D (·········· , ··········)   *(Suez 2015)*
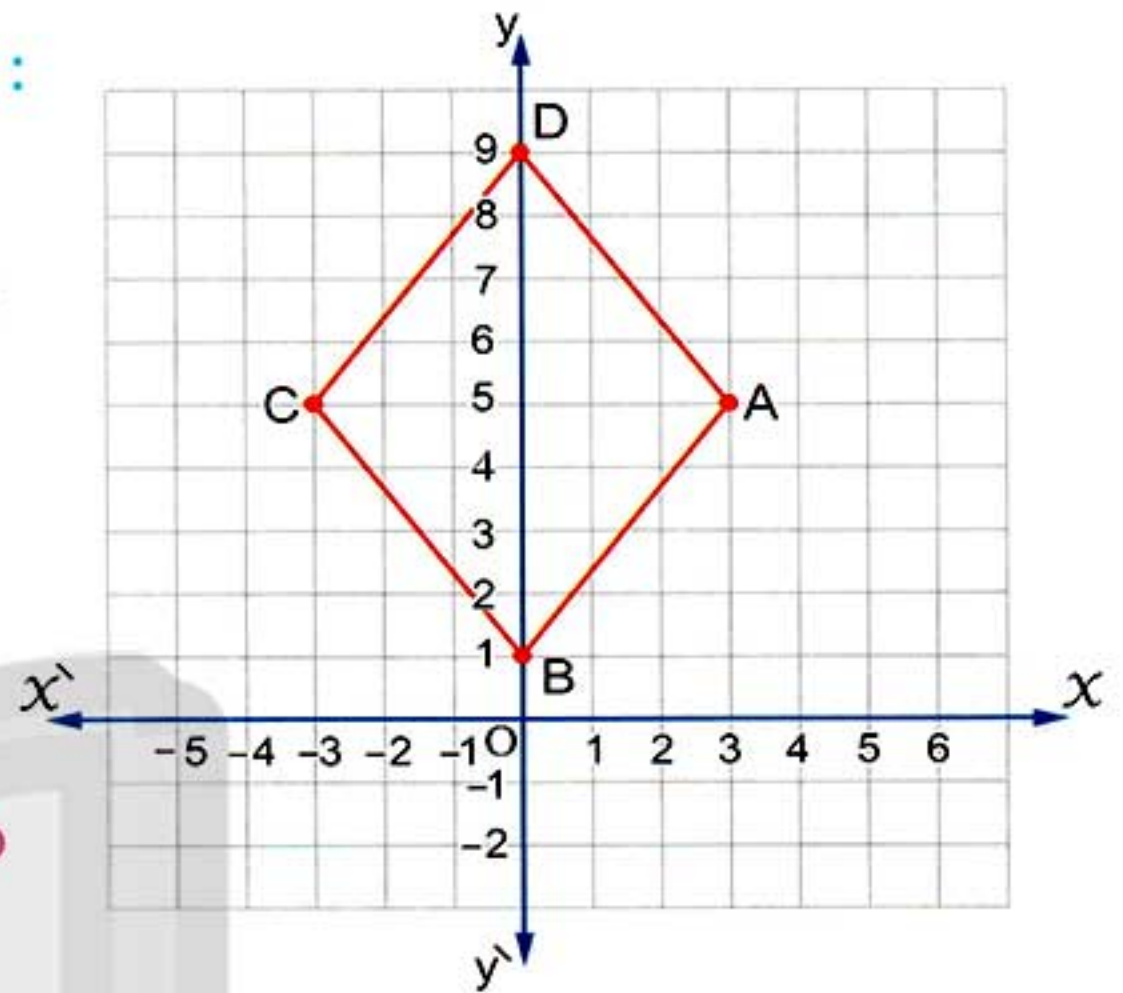
b The area of the rhombus ABCD can be calculated by using the length of its perpendicular diagonals , where :

The length of $\overline{AC}$ = ··········

, the length of $\overline{BD}$ = ··········

The area of the rhombus = ··········

9 **In the opposite coordinate plane :**

ABCD is a square , then complete :

a The coordinates of the points :

A (·········· , ··········)

, B (·········· , ··········)

, C (·········· , ··········)

and D (·········· , ··········)
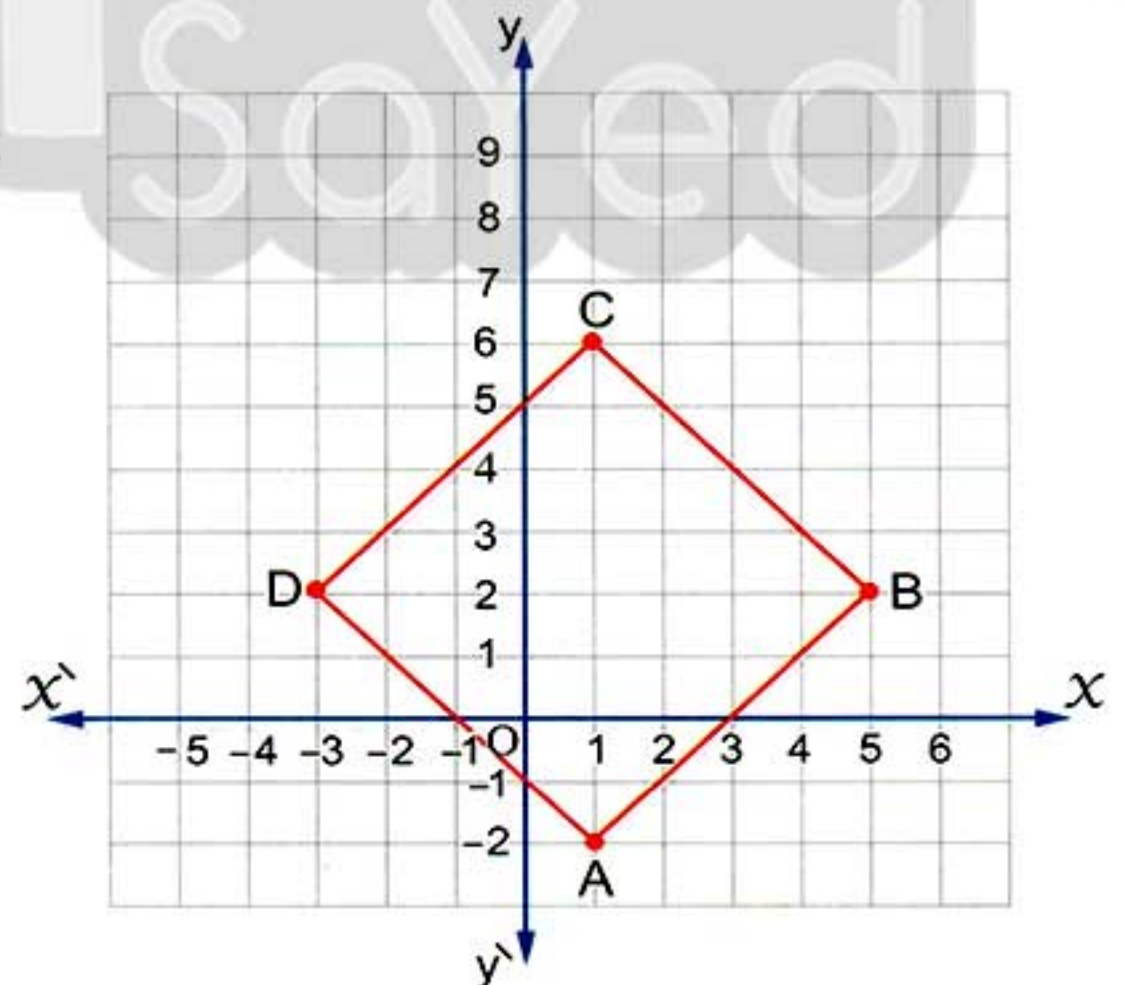
b The length of $\overline{AC}$ = ··········

, the length of $\overline{DB}$ = ··········

c The area of the square ABCD = ··········

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Exercise 11

Geometric transformations (Translation)

📖 From the school book

1 In the following shapes determine the type of the geometric transformation (reflection , translation or rotation) :

a	b	c
F F	⋖ F	Ⅎ F

d	e	f

g 📖	h	i 📖

2 Determine which of the following shapes is symmetric and which is not symmetric , then draw the axes of symmetry :

a	b	c
(rhombus)	W	(cross)

d	e	f
N	(parallelogram)	(dice)

الصف السادس الابتدائى   موقع ذاكرولى التعليمى   كتاب المعاصر

LESSON 2
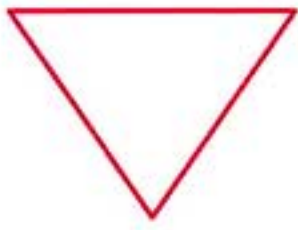
g 📖 | h 📖 | i 📖

3 Complete the following table :

The point	The translation	The image
(2 , 3)	$(x , y) \longrightarrow (x + 3 , y + 1)$	(········ , ········)
(········ , ········)	$(x , y) \longrightarrow (x + 2 , y - 1)$	(− 3 , 3)
(0 , − 3)	$(x , y) \longrightarrow (x + ········ , y + ········)$	(0 , 0)
(− 4 , − 1)	$(x , y) \longrightarrow (x + 3 , y + 1)$	(········ , ········)

4 Complete each of the following :

a Two elements must be known for the translation :

[1] ········ [2] ········

b The image of the point (2 , 5) by translation

$(x , y) \longrightarrow (x + 2 , y + 1)$ is ········

c The image of the point (− 5 , 4) by translation

$(x , y) \longrightarrow (x + 4 , y - 5)$ is ········

d The image of the point (3 , 2) by translation

$(x + 3 , y - 2)$ is ········

(Giza 2013)

e The image of the point A (− 5 , 2) by translation

$(− 1 , − 3)$ is À (········ , ········)

(El-Sharkia 2011)

f The image of the point (2 , − 1) by translation

$(− 3 , 5)$ is ········

(Assiut 2016)

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g The image of the point A (4 , 5) by translation

(− 2 , 1) is ⋯⋯⋯

(Aswan 2017)

h The image of the point A (2 , − 1) by translation

$(x − 1 , y + 3)$ is ⋯⋯⋯

(Suez 2016)

i The image of the point (0 , 2) by translation

$(x + 1 , y + 3)$ is (⋯⋯⋯ , ⋯⋯⋯)

(Alexandria 2011)

j The image of the point (− 2 , − 5) by translation

$(x , y) \longrightarrow (x − 2 , y)$ is ⋯⋯⋯

k The image of the point (3 , − 2) by translation

$(x , y) \longrightarrow (x , y + 3)$ is ⋯⋯⋯

l The image of the point ⋯⋯⋯ by translation

$(x , y) \longrightarrow (x − 2 , y + 3)$ is (7 , 4)

m The point (a , b), its image is (5 , − 4) by translation (2 , − 3) , then the

coordinates of the point (a , b) = ⋯⋯⋯

(El-Kalyoubia 2017)

n If the image of the point (3 , 2) is the point (6 , 1) , then the translation

rule is $(x , y) \longrightarrow$ (⋯⋯⋯ , ⋯⋯⋯)

o The image of the point A (3 , 6) by translation 3 units in the negative

direction of x-axis is ⋯⋯⋯

p If $\grave{A}$ is the image of A by translation of magnitude (MN) in the direction

of $\overrightarrow{MN}$, then $A \grave{A}$ = ⋯⋯⋯

(El-Monofia 2011)

q In the opposite figure :

$\grave{A}$ is the image of A by translation.

Its magnitude is ⋯⋯⋯ cm.

in the direction of ⋯⋯⋯

(Red Sea 2011)

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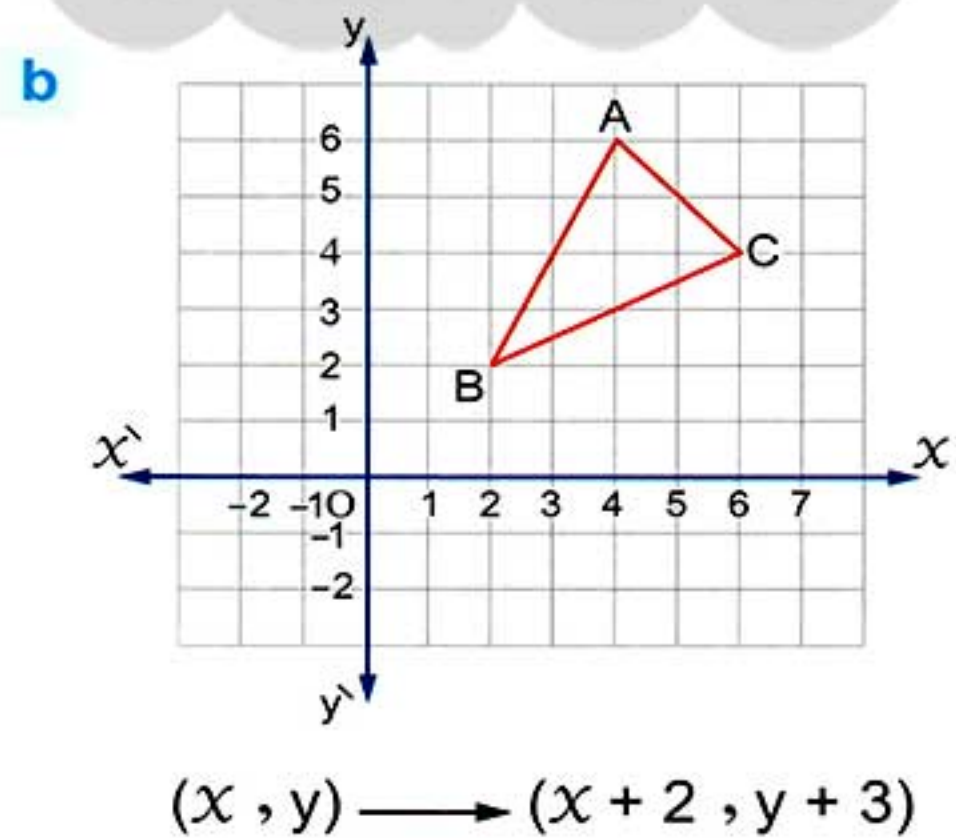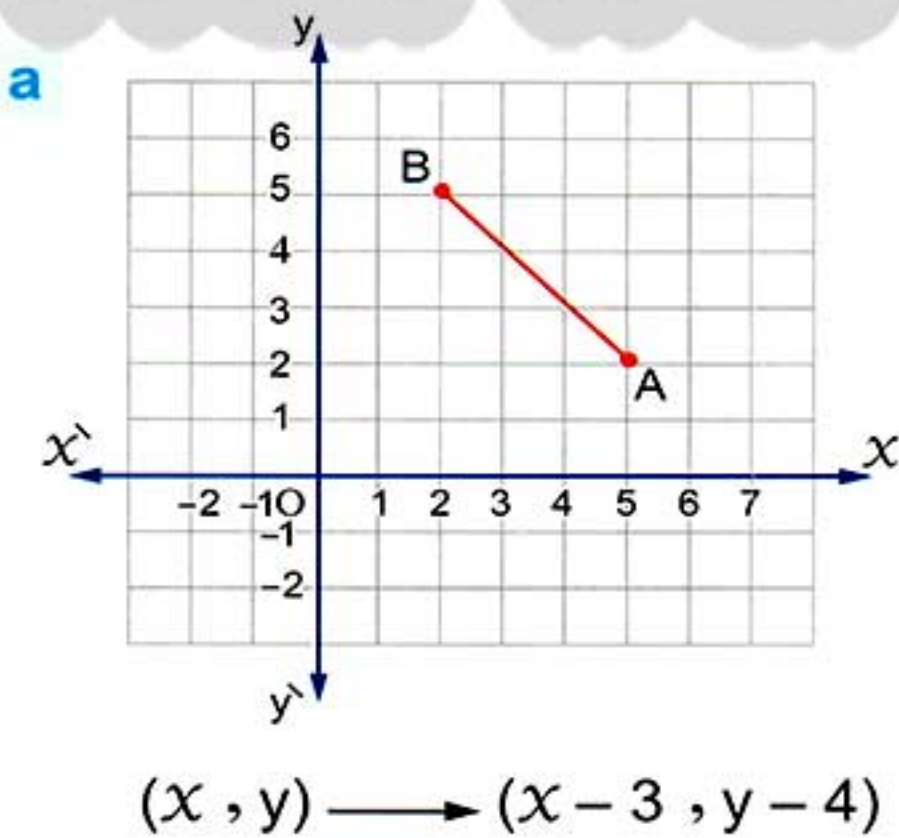
LESSON 2
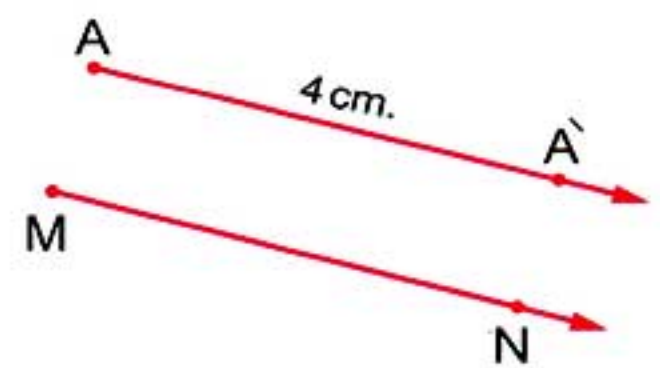
5 Choose the correct answer :

a The image of the point A (1 , 2) by translation (1 , – 1) is ·········

(a) (2 , 1)   (b) (2 , 3)   (c) (1 , 1)   (d) (1 , 3)

b 📖 The image of the point A (– 4 , 3) by translation (– 1 , – 4)
is ·········
(Damietta 2017)

(a) (– 3 , – 1)   (b) (– 7 , 3)   (c) (– 5 , – 7)   (d) (– 5 , – 1)

c The image of the point (3 , – 2) by translation (4 , 2)
is ·········
(El-Kalyoubia 2015)

(a) (– 7 , 0)   (b) (7 , 0)   (c) (– 1 , 4)   (d) (1 , 7)

d The image of the point (3 , – 2) by translation (– 3 , 2)
is ·········
(El-Beheira 2016)

(a) (0 , 0)   (b) (2 , 0)   (c) (3 , 0)   (d) (6 , 4)

e The image of the point (4 , – 3) by translation (– 2 , 3)
is ·········
(Ismailia 2012)

(a) (2 , 0)   (b) (6 , – 6)   (c) (– 6 , 6)   (d) (– 2 , – 1)

f If (x , y) is the image of the point (3 , – 2) by translation (1 , 3)
, then the point (x , y) = ·········

(a) (2 , 1)   (b) (2 , 4)   (c) (1 , 4)   (d) (4 , 1)

g The image of the point A (3 , – 4) by translation $(x + 1 , y + 4)$
is ·········
(Giza 2012)

(a) (4 , 0)   (b) (4 , 8)   (c) (3 , 8)   (d) (3 , 0)

h The image of the point A (5 , 1) by translation $(x – 1 , y – 1)$
is ·········
(El-Kalyoubia 2011)

(a) (4 , 0)   (b) (6 , 2)   (c) (4 , 2)   (d) (– 4 , – 2)

i If A (1 , 2) , then the image of A by translation $(x + 1 , y – 1)$
is ·········
(Suez 2013)

(a) (2 , 3)   (b) (2 , 1)   (c) (1 , 1)   (d) (1 , 3)

j 📖 The image of the point (3 , 5) by the translation $(x + 2 , y – 1)$ is ·········

(a) (5 , 6)   (b) (5 , 4)   (c) (1 , 4)   (d) (1 , 6)

k 📖 The image of the point $(-1, 2)$ by translation of magnitude of 3 units in the positive direction of the x-axis is ·········

(a) $(-1, 5)$ **(b)** $(2, 2)$ **(c)** $(-2, 2)$ **(d)** $(-1, 3)$

l The image of the point $(-3, 4)$ by translation of magnitude of 4 units in the negative direction of the y-axis is ········· *(El-Beheira 2015)*

(a) $(-3, 0)$ **(b)** $(-7, 4)$ **(c)** $(-3, 8)$ **(d)** $(-1, 4)$

m The image of the point $(3, 0)$ by translation of magnitude 3 units in the negative direction of x-axis is ·········

(a) $(0, 0)$ **(b)** $(3, 3)$ **(c)** $(3, -3)$ **(d)** $(0, -3)$

n The image of the point $(2, -1)$ by translation of magnitude 3 units in the positive direction of y-axis is ·········

(a) $(2, 2)$ **(b)** $(5, -1)$ **(c)** $(5, 2)$ **(d)** $(2, -4)$

o If $\grave{A}(3, -3)$ is the image of A by translation $(x, y) \longrightarrow (x-1, y-4)$, then the point A is ·········

(a) $(2, -7)$ **(b)** $(4, 1)$ **(c)** $(-4, -1)$ **(d)** $(2, 1)$

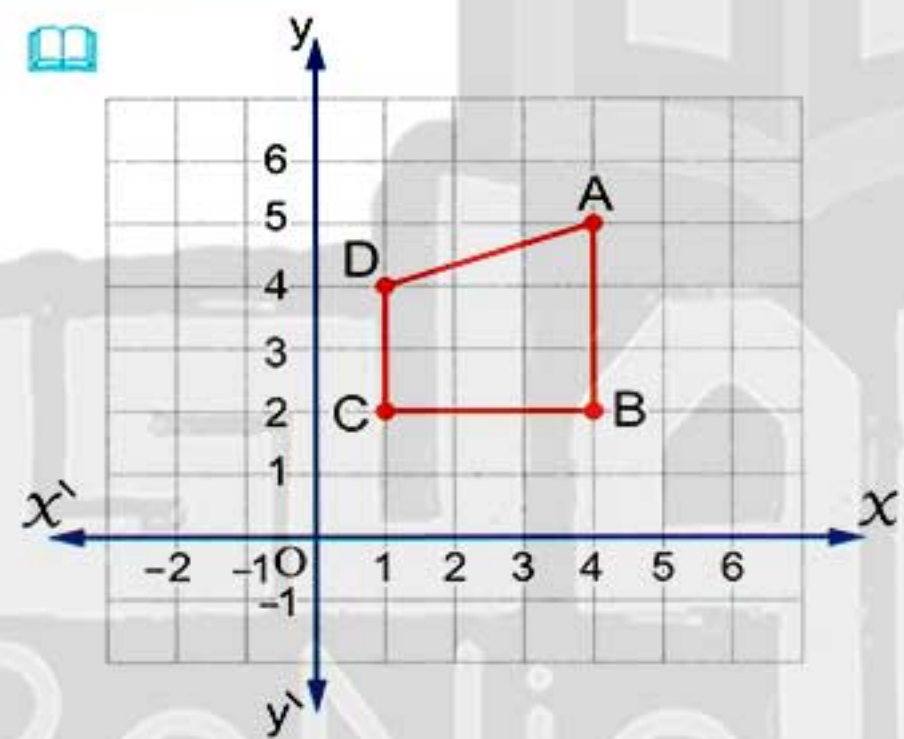**6** Find the image of each of the following figures by the indicated translation :

a

$(x, y) \longrightarrow (x-3, y-4)$

b

$(x, y) \longrightarrow (x+2, y+3)$

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LESSON 2

c
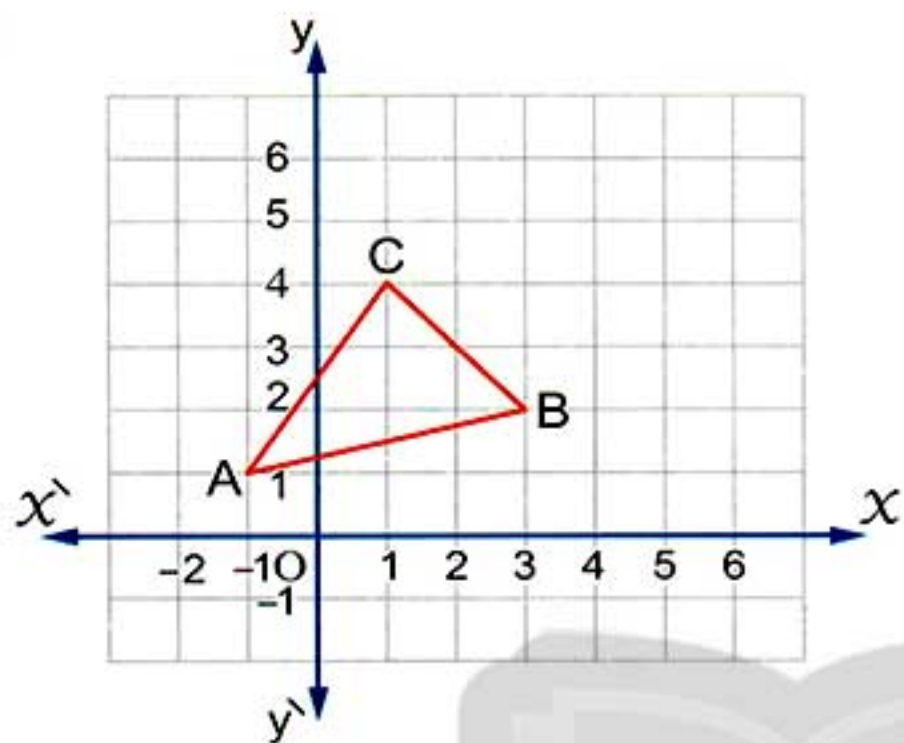
$$(x , y) \longrightarrow (x + 2 , y)$$
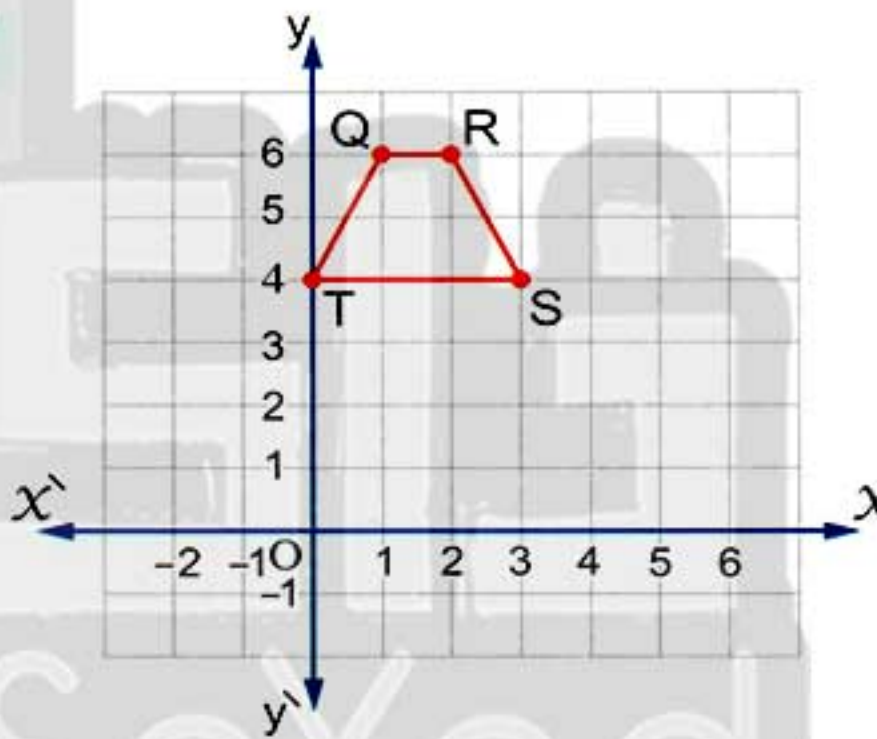
d
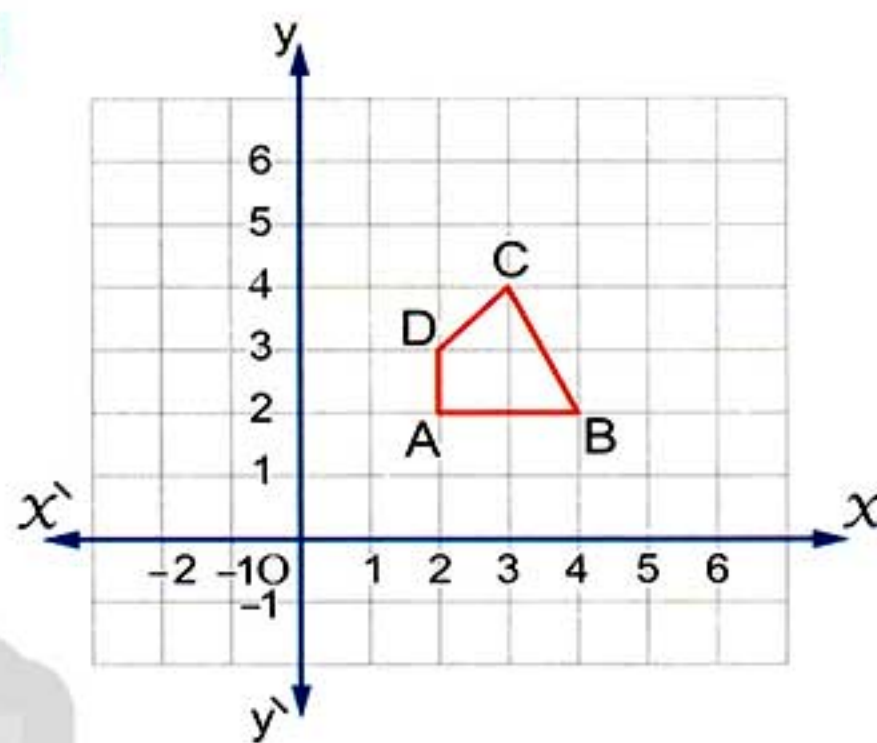
$$(x , y) \longrightarrow (x + 3 , y - 2)$$
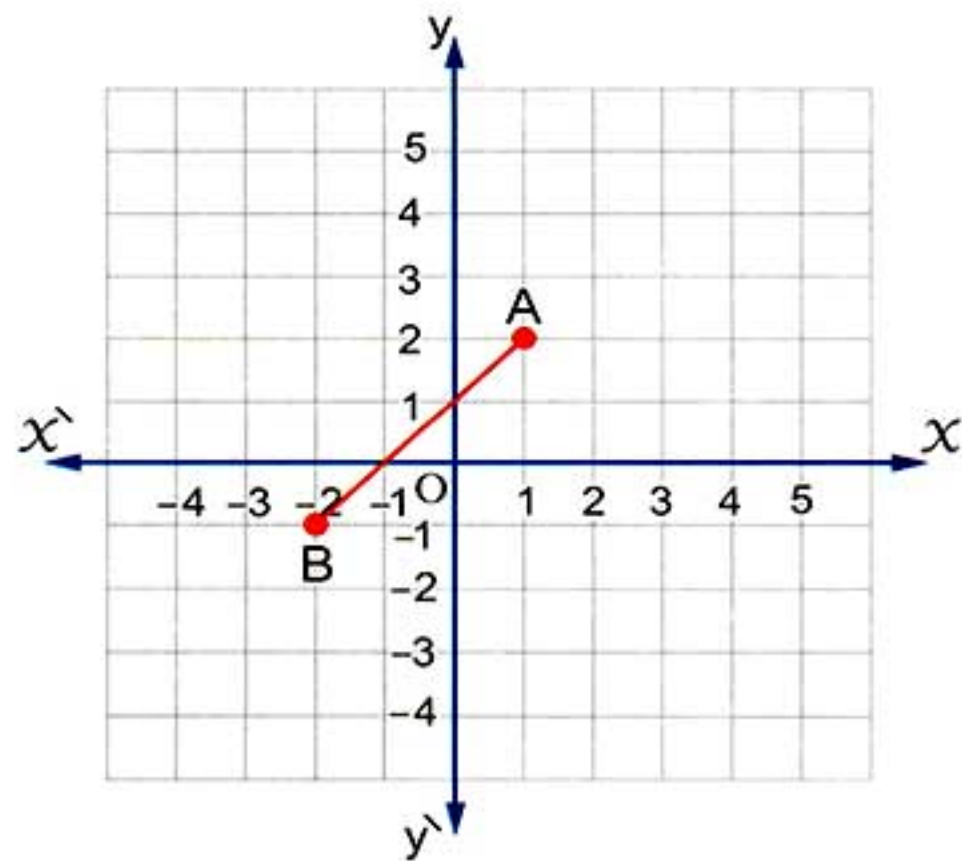
e 📖

by translation (3 , − 4)

f

translate 1 unit to the right and 4 units downwards.

7 **In the opposite figure :**

Find the image of the line segment $\overline{AB}$ where A (1 , 2), B (− 2 , − 1) by translation $(x + 2 , y − 2)$
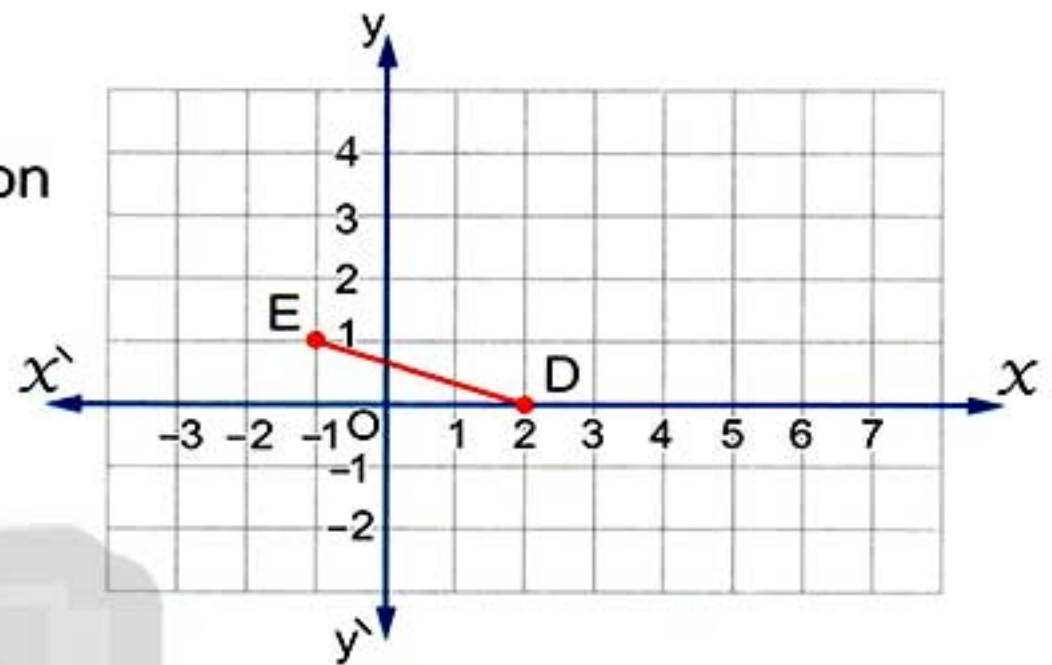
(South Sinai 2011)

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8 📖 **In the opposite coordinate plane :**

a Determine the image of $\overline{DE}$ where

D (2 , 0) and E (− 1 , 1) by translation

$(x , y) \longrightarrow (x + 3 , y + 2)$

b What is the name of the shape

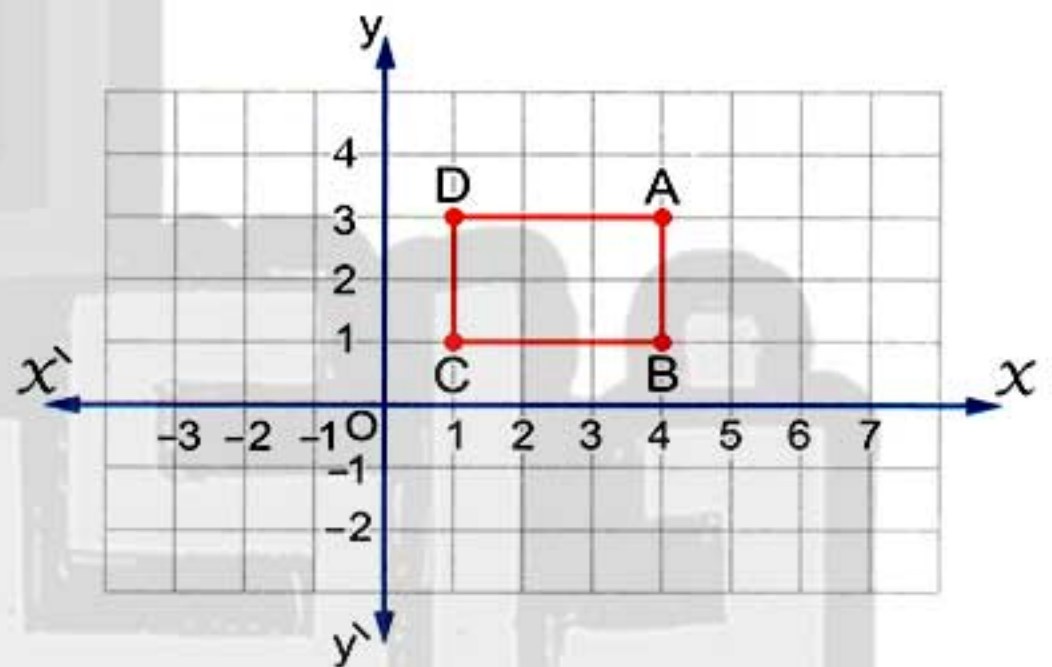$DD\grave{E}E$? Why ?

9 **In the opposite figure :**

ABCD is a rectangle where A (4 , 3) ,

B (4 , 1) , C (1 , 1) and D (1 , 3)

Find its image by

translation $(x − 2 , y − 5)$

10 **In the opposite figure :**

a Determine the coordinates of

the following points :

A (········· , ·········)

, B (········· , ·········)

, C (········· , ·········)

and D (········· , ·········)

b Find the image of the parallelogram

ABCD by translation

$(x , y) \longrightarrow (x + 2 , y − 4)$

(143)

LESSON 2
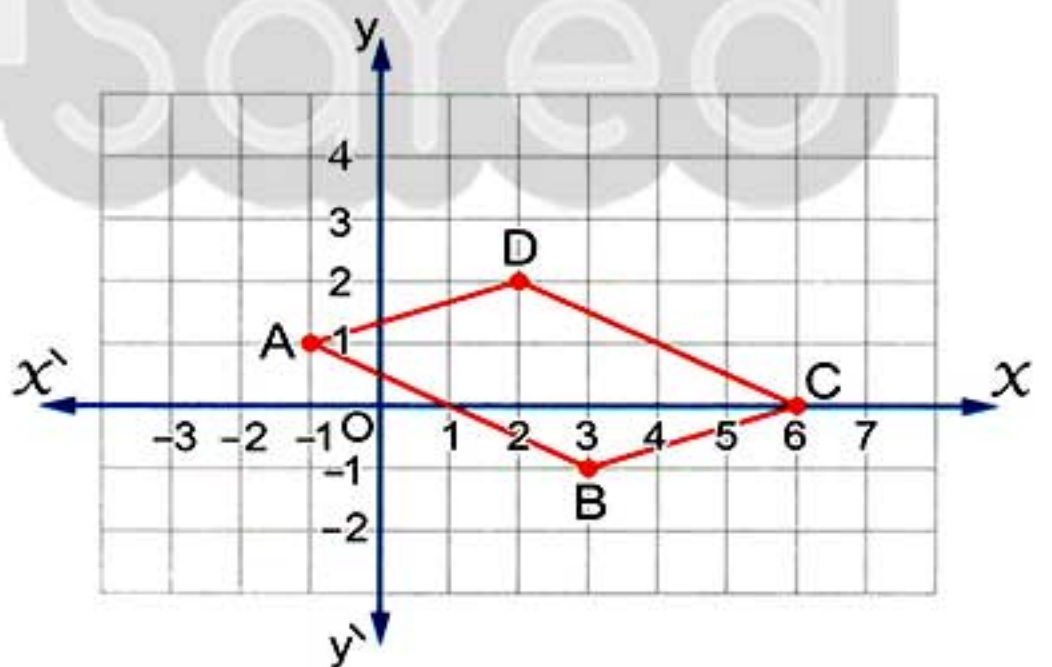
11 📖 **In the opposite figure :**

a Determine the coordinates
of the following points :
A (·········· , ··········) , B (·········· , ··········)
and C (·········· , ··········)

b Find the image of the △ ABC by
translation $(x , y) \longrightarrow (x + 2 , y + 3)$

c The length of $\overline{BC}$ = ··········
The length of $\overline{AB}$ = ··········

d Is △ ABC symmetric or not ? Why ?
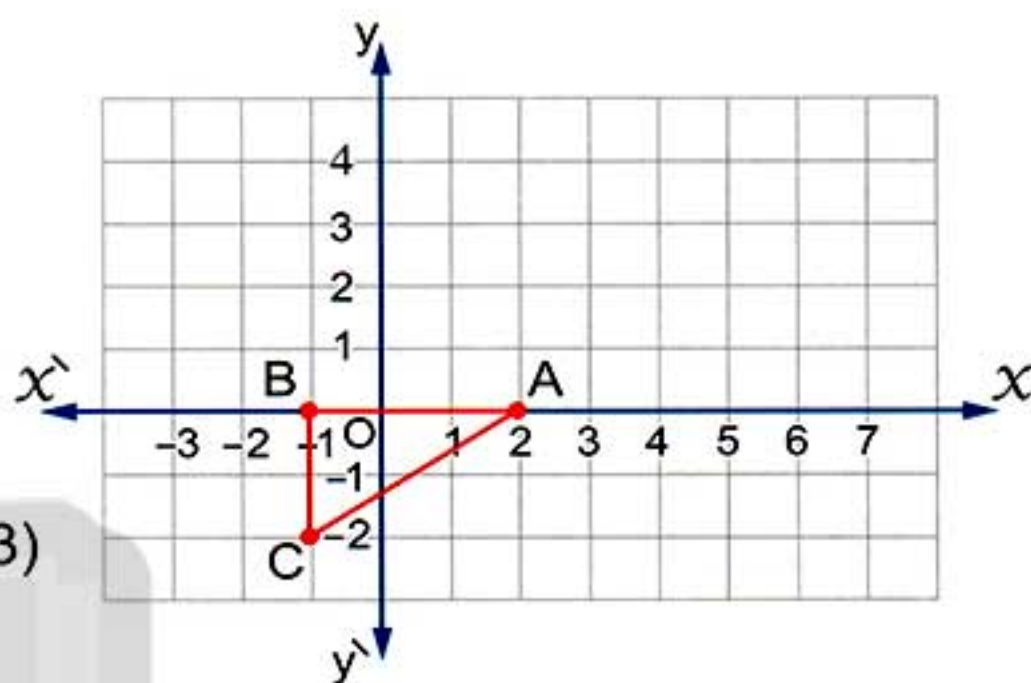
12 **On the opposite coordinate plane :**

a Determine the following points :
A (2 , − 2) , B (1 , 1) and C (1 , 6)

b Find $\grave{A}$ which is the image of the
point A by translation (2 , − 1)

c Find $\overline{B\grave{C}}$ which is the image
of $\overline{BC}$ by translation (3 , 0)

d Find BC and B$\grave{B}$

e Calculate the perimeter and
the area for the shape B$\grave{B}$$\grave{C}$C
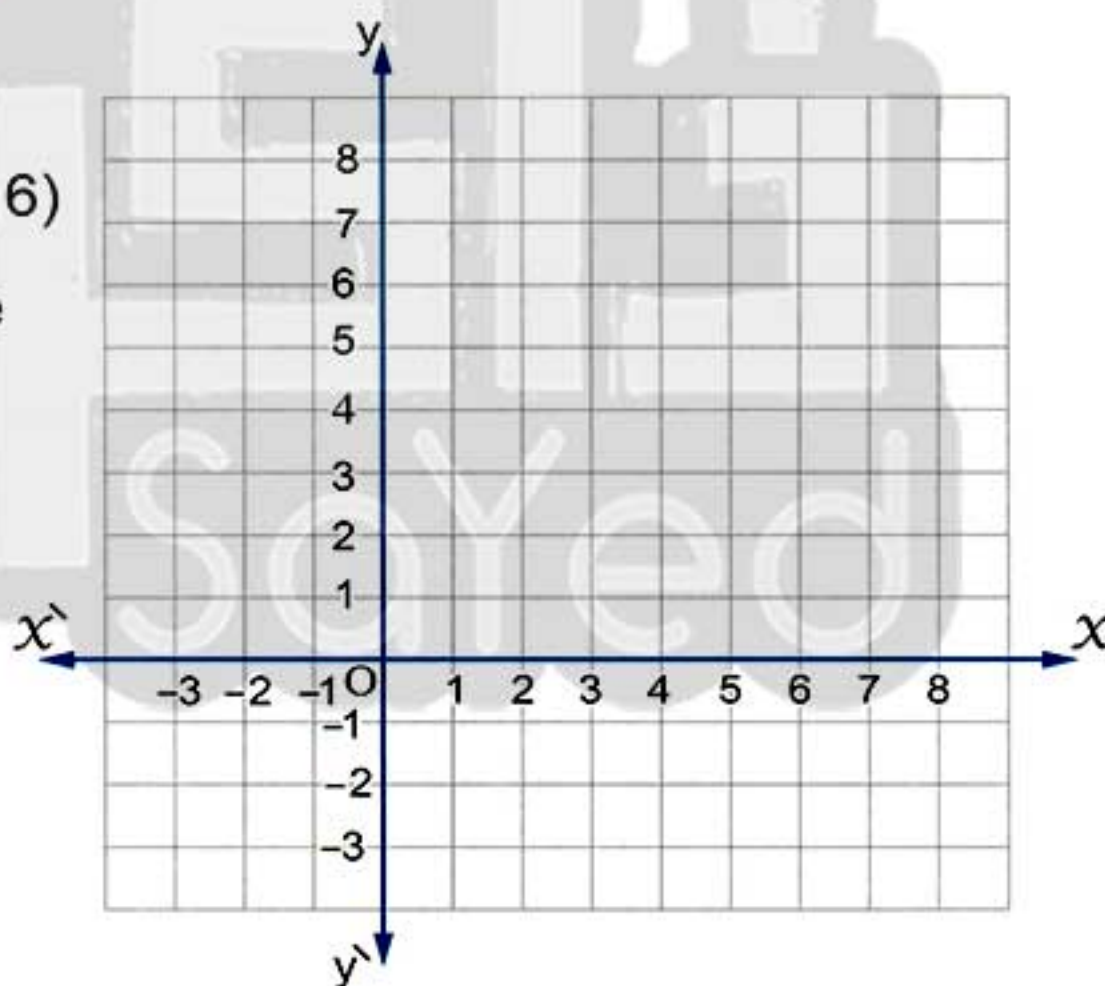
13 📖 **In the opposite figure :**

Find the image of the point A by
the translation $\overline{ME}$
in the direction of $\overrightarrow{MN}$
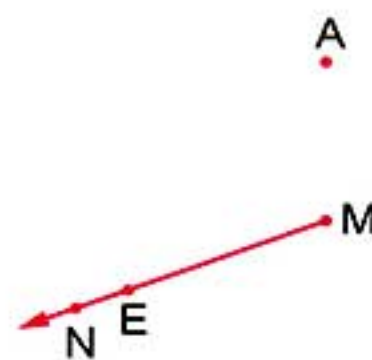
Unit Three

14 Using the geometric tools , draw the image of each of the following by translation MN in the direction of $\overrightarrow{MN}$ as shown in each case :
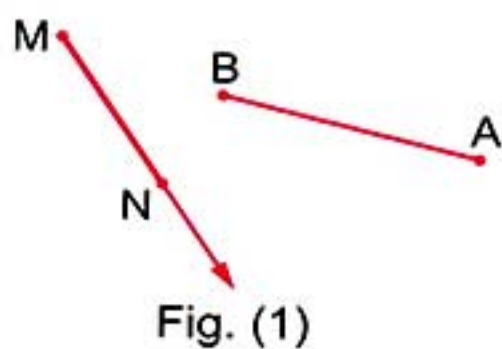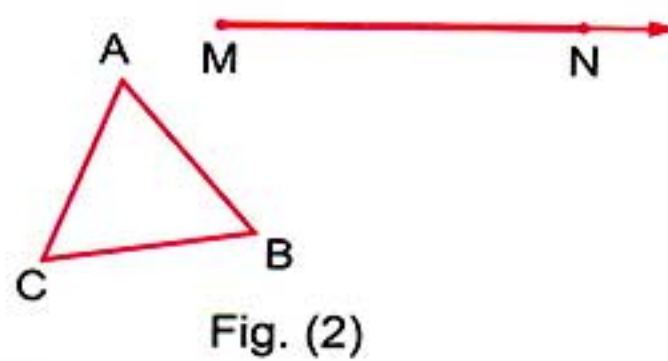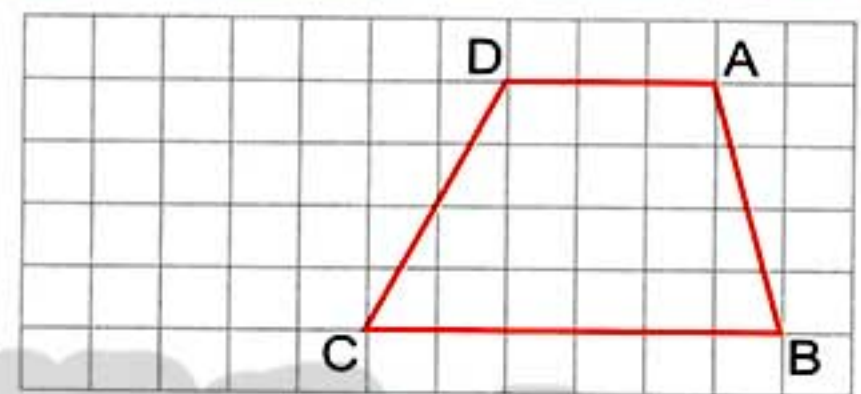
Fig. (1)

Fig. (2)

15 Using the grid , draw the image of the figure ABCD by the translation of 4 units in the direction of $\overrightarrow{BC}$

16 Determine in the coordinates plane the image of the line segment $\overline{AB}$ where A (2 , 3) and B (− 2 , 0) by translation ($x + 3$, $y − 2$)   *(Alexandria 2012)*

17 In the coordinates plane :

Draw the △ ABC where A (0 , 1) , B (2 , 3) and C (− 1 , 4) , then find its image by translation ($x + 2$, $y + 3$)   *(Damietta 2013)*

18 📖 Draw △ ABC where A (1 , 1) , B (− 3 , − 1) and C (0 , − 5) , then determine graphically its image by translation (5 , 0)

19 Plot the points O (0 , 0) , B (2 , 0) and C (0 , 2) on the coordinate plane , then find :

a The length of $\overline{OB}$

b The image of the triangle OBC by the translation ($x + 2$, $y + 2$)

   (Cairo 2015)

20 📖 Determine in the coordinate plane the following points A (− 3 , 4) , B (1 , 4) and C (1 , 2) , then find :

a AB = ········· , BC = ·········

b The image of △ ABC by the translation (0 , − 3)   *(El-Sharkia 2017)*

LESSON 2

21 📖 Represent the points A (2 , 3) , B (4 , 3) and C (4 , 7) in the lattice , then find :

a BC = ········· length unit , AB = ········· length unit

b The image of △ ABC by translation (0 , − 4)   *(Port Said 2016)*

c The area of △ ABC

22 Determine in the coordinates plane the rectangle ABCD image where

A (2 , 3) , B (2 , 1) , C (− 2 , 1) , D (− 2 , 3) by translation (x + 3 , y + 3)

What is the type of the resulting figure ÀB̀C̀D̀ ?   *(El-Fayoum 2011)*

23 In the coordinates plane :

Draw the rectangle ABCD where A (4 , 2) , B (4 , 4) , C (1 , 4) and D (1 , 2)

a Draw its image by translation (x + 2 , y + 2)

b Calculate the perimeter of the image of rectangle ABCD   *(Cairo 2013)*

24 Find the image of each of the following points by the translation

$(x , y) \longrightarrow (x + 2 , y − 3)$ followed by the translation

$(x , y) \longrightarrow (x − 3 , y + 1)$

a (4 , − 2)   **b** (− 1 , 3)   **c** (0 , 2)

25 Use the translation $(x , y) \longrightarrow (x + 2 , y + 3)$ to locate the point whose image is (2 , 3)

26 📖 The image of (a , b) by translation (2 , − 3) is (5 , − 4) , find (a , b)
*(Matrouh 2017)*

27 If the image of the point A (1 , 1) by translation in the plane is À (2 , 2) , find the images of the points O (0 , 0) , B (− 1 , 3) and C (− 3 , 5) by the same translation.

(146)

28 If A (– 3 , 1) and B (1 , – 2) , write the rule of the translation that makes B the image of A

29 The point À (3 , – 3) is the image of the point A by the translation $(x , y) \longrightarrow (x – 1 , y – 4)$ Locate A , then by the same translation , draw the image of △ ABC where B (5 , 0) and C (– 1 , – 2)

30 In the opposite figure :

Copy the graph , then draw the triangle ABC whose image is △ ÀBC by the translation $(x , y) \longrightarrow (x + 2 , y + 3)$
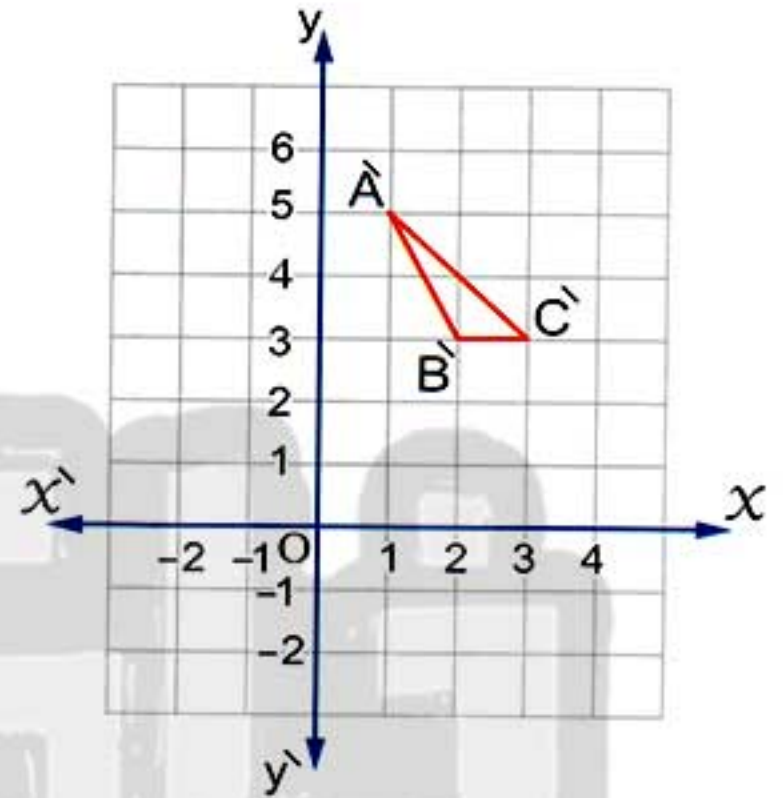
31 State whether the graph shows a reflection and name the line of reflection or a translation and describe the translation :
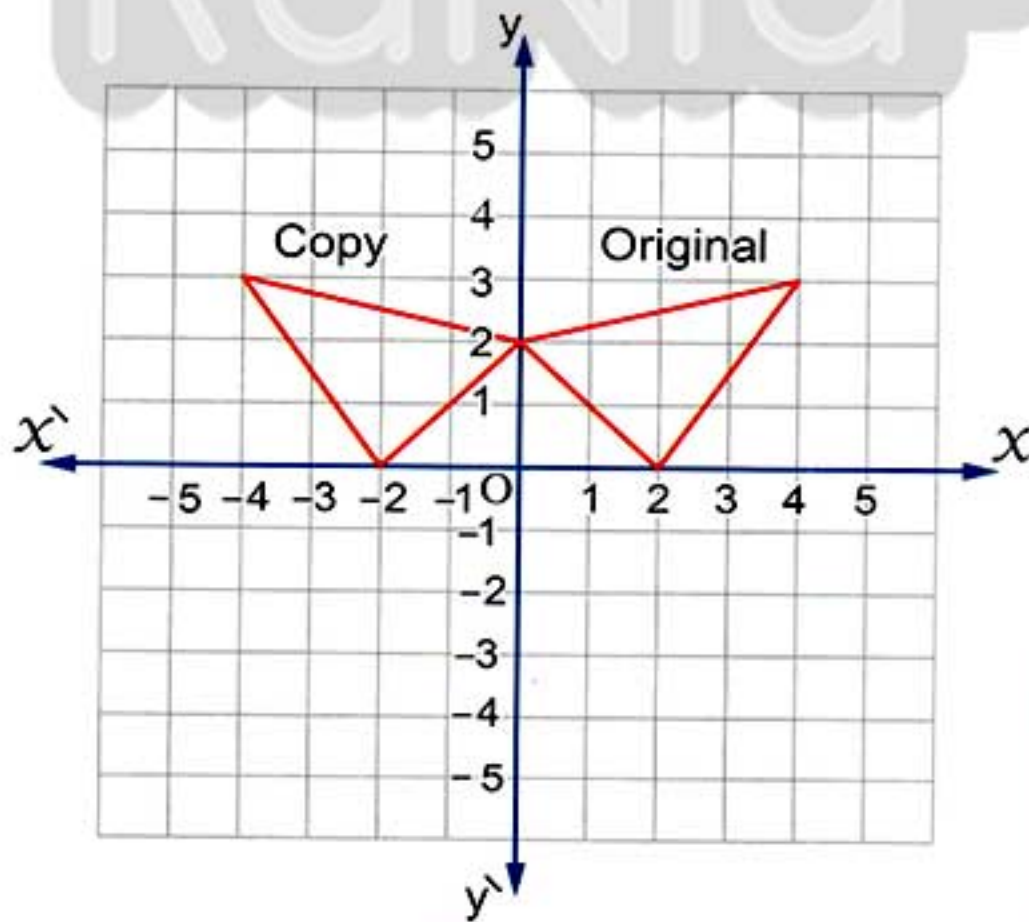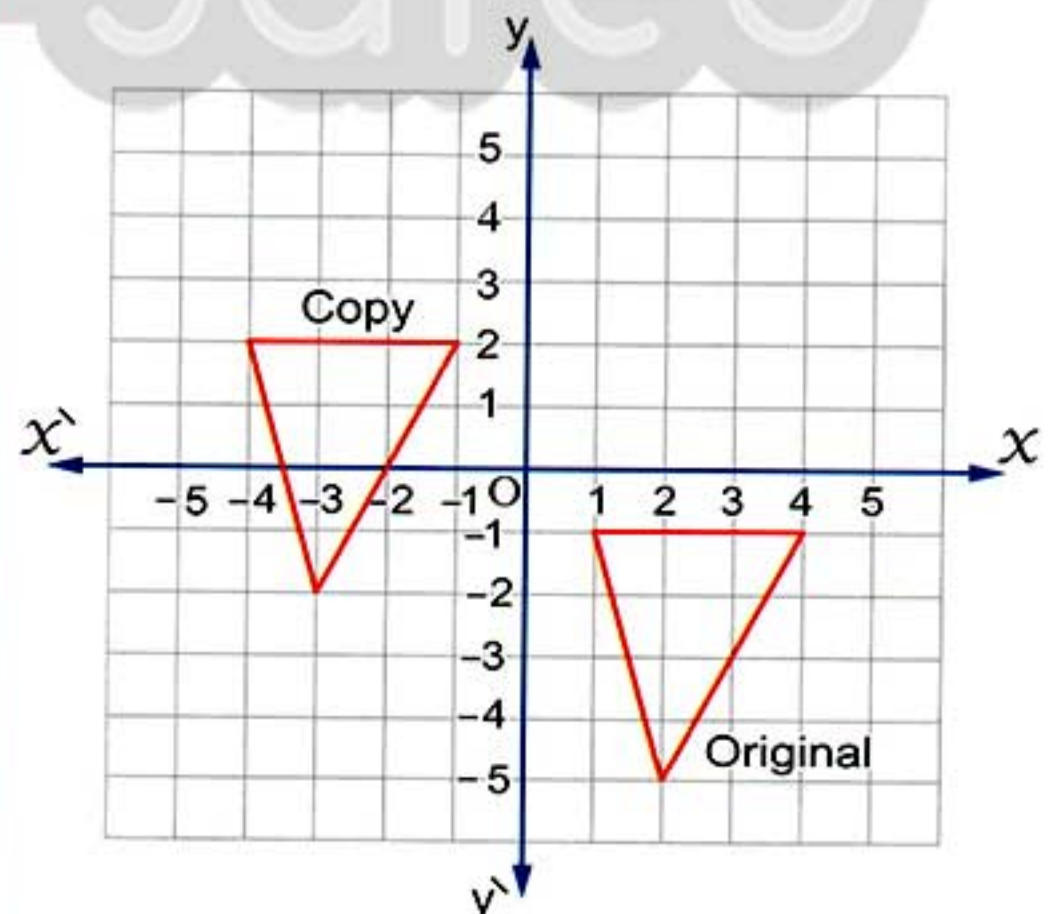

Fig. (1)

Fig. (2)

Sheet **1**

On lesson **1** unit **1**

1 Complete each of the following :

[a] $\mathbb{Z}^+ \cap \mathbb{Z}^- = $ ....

[b] $|-13| = $ ....

[c] The opposite of 7 is ....

[d] $\mathbb{Z} - \mathbb{N} = $ ....

[e] $\mathbb{N} \cap \mathbb{Z} = $ ....

5

2 Put the suitable sign "$\in , \notin , \subset \text{ or } \not\subset$" :

[a] -7 ⬜ $\mathbb{N}$

[b] $\dfrac{9}{3}$ ⬜ $\mathbb{Z}$

[c] $\mathbb{Z}^+$ ⬜ $\mathbb{N}$

[d] $|-35|$ ⬜ $\mathbb{N}$

[e] $\mathbb{N}$ ⬜ $\mathbb{Z}^-$

5

3 Write an integer to represent each situation :

[a] A temperature of 2 degrees below zero.   (................)

[b] An increase of L.E. 7   (................)

[c] 9 m. above the sea level.   (................)

[d] A loss of P.T. 80   (................)

[e] A bank deposit of L.E. 95   (................)

5

4 Find the result of each of the following :

[a] $3 + |-3| = $ ....

[b] $|25| \div |-5| = $ ....

[c] $|-11| + 22 = $ ....

[d] $|-6| \times |3| = $ ....

[e] $|-9| \times 0 = $ ....

5

5 Represent the following numbers on the number line :

[a] -3

[b] $|-5|$

[c] $-|2|$

[d] $\{7 , 8 , 9\}$

[e] $\{-3 , -4 , -5 , -6 , ...\}$

5

6

Sheet 2

From lesson 1 unit 1
to lesson 2 unit 1

Total mark 25

1 Put the suitable relation "> , = or <" :   5

[a] – 8 ☐ 4

[b] 0 ☐ – 2

[c] 5 ☐ | – 5 |

[d] – 3 ☐ – 5

[e] | – 9 | ☐ – | – 10 |

2 [a] Arrange the following numbers in an ascending order :   5

– 6 , 15 , 0 , | – 9 | and – 18

[b] Arrange the following numbers in a descending order :

– 9 , 17 , | – 9 | , – 15 and 16

3 Complete each of the following :   5

[a] The number ……… is neither positive nor negative.

[b] – 4 , – 3 , – 2 , ……… , ……… , ……… (in the same pattern)

[c] $\mathbb{Z} - \mathbb{Z}^- = $ ………

[d] The smallest positive integer is ………

[e] | – 12 | + | – 21 | = ………

4 Write :   4

[a] The previous integer and the next integer of – 27

[b] The integers between the two integers – 5 and 3

5 Write using the listing method each of the following sets :   6

[a] The set of integers greater than – 4

[b] The set of integers smaller than – 1

[c] The set of non-negative integers.

[d] The set of integers smaller than 5 and greater than – 6

7

Sheet **3**

Total mark
25

1 Find the result of each of the following :

5

[a] (− 7) + 2 = ············

[b] (− 4) + (− 5) = ············

[c] 14 − 27 = ············

[d] 16 − (− 3) = ············

[e] 12 + (− 12) = ············

2 Write the property of addition in $\mathbb{Z}$ in each of the following :

4

[a] (− 5 + 6) + 9 = − 5 + (6 + 9)   (································)

[b] (− 8) + 7 = 7 + (− 8)   (································)

[c] − 11 + 0 = − 11   (································)

[d] 14 + (− 14) = 0   (································)

3 Complete each of the following :

5

[a] 4 + (− 7) − 2 = ············

[b] − 8 + 5 + 8 = ············

[c] | − 7 | + ············ = 0

[d] 4 + ············ = − 1

[e] The additive inverse of (− 5) is ············

4 Use the properties of addition in $\mathbb{Z}$ to find :

6

[a] − 15 + 29 + 15

[b] 55 + (− 255) + 45 + 255

5 Arrange each of the following in an ascending order :

5

[a] | − 3 | , 5 , − 3 , 0 and 4

[b] 1 , 11 , − 1 and − 11

(8)

Sheet **4**

From lesson 1 unit 1
to lesson 4 unit 1

Total mark **25**

1 **Complete :**

[a] The product of two negative integers is ··········

[b] $17 \times$ ·········· $= (-5) \times 17$

[c] $-|-2| =$ ··········

[d] $\mathbb{Z}^+ \cup \{0\} =$ ··········

[e] $5 \times (-2) =$ ··········

(5)

2 **Find the result of each of the following :**

[a] $9 \times (-3)$

[b] $(-36) + (-4)$

[c] $\left[8 + (-5)\right] \times 6$

[d] $6 \times \left[-2 + (-7)\right]$

(4)

3 **[a]** Use the properties of multiplication of integers to find each of the following :

(1) $50 \times 14 \times 2$

(2) $8 \times (-9) \times 125 \times 3$

[b] Use the distributive property to find the result of each of the following :

(1) $3 \times (-2) + 3 \times 5$

(2) $112 \times 98 + 112 \times (-97)$

(6)

4 **Use the distributive property to find :**

[a] 54×101

[b] 73×99

(4)

5 **[a]** Write using the listing method each of the following sets :

(1) The set of integers greater than -3

(2) The set of integers included between -4 and 2

[b] Use the properties of addition in $\mathbb{Z}$ to find :

(1) $5 + 4 + (-5)$

(2) $45 + 36 + 55 + 64$

(6)

Sheet **1**

On lesson 1 unit 3

---

1 Determine the position of each of the following points
A (1 , – 1) , B (4 , – 1) and C (4 , 5) , then find :

[a] The length of each of $\overline{AB}$ and $\overline{BC}$

[b] The type of the triangle ABC with respect to its side lengths and its angles.

[c] The area of the triangle ABC

5

---

2 **In the opposite figure :**
ABCD is a rhombus , complete :

[a] A (·········· , ··········) ,
   B (·········· , ··········) ,
   C (·········· , ··········) ,
   and D (·········· , ··········)

[b] The length of $\overline{AC}$ = ··········

[c] The length of $\overline{BD}$ = ··········

[d] The surface area of the rhombus ABCD = ··········
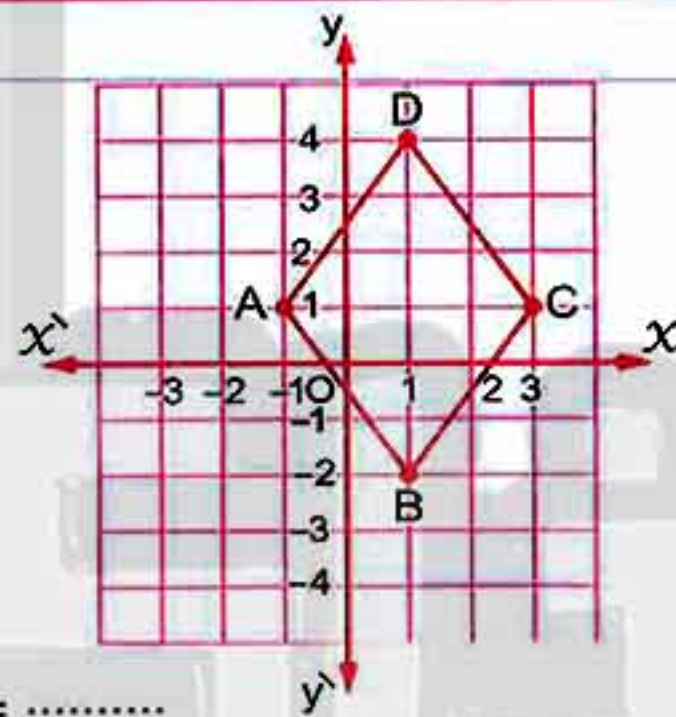
5

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3 Determine the positions of X (– 2 , 2) , Y (– 2 , – 3) , Z (3 , – 3)
and L (3 , 2) , then find :

[a] The name of the shape XYZL

[b] The perimeter and the area of the shape XYZL

[c] The number of axes of symmetry for the shape XYZL

5

---

4 Determine the positions of L (– 2 , – 1) , M (1 , – 1) , N (1 , 3)
and P (– 2 , 3) , then find :

[a] The length of each of $\overline{LP}$ and $\overline{PN}$

[b] The perimeter and the area of the shape LMNP

5

---

5 On a square lattice , draw Δ QRS where Q (– 1 , – 3) , R (3 , – 3)
and S (1 , 6) , then find :

[a] The length of $\overline{QR}$

[b] The type of the triangle QRS according to its side lengths.

[c] The number of axes of symmetry for the triangle QRS

5

(16)

Sheet 2

From lesson 1 unit 3
to lesson 2 unit 3

1 On a square lattice , draw △ ABC where A (5 , 3) , B (1 , 1) and C (6 , −3) , then find its image by translation

$(x , y) \longrightarrow (x − 4 , y + 1)$

$\boxed{5}$

2 On the coordinate plane , determine the points A (1 , 2) , B (−2 , 2) and C (−2 , −4) , then find :

[a] The length of $\overline{AB}$

[b] The length of $\overline{BC}$

[c] The image of △ ABC by translation (3 , −1)

$\boxed{5}$

3 If A (1 , −1) and B (−1 , 3) , write the mapping rule of the translation that makes B the image of A

$\boxed{5}$

4 On a lattice , plot the vertices of the triangle ABC where A (1 , 1) , B (−3 , −1) and C (0 , −5) , then draw its image by translation $(x + 4 , y + 1)$

$\boxed{5}$

5 On a square lattice , draw △ MNT where M (1 , −3) , N (−3 , 1) and T (−2 , −5) , then draw its image by translation of magnitude 3 units in the positive direction of y-axis.

$\boxed{5}$

EXERCISE **1** The set of integers (Z)

1 📖 **Complete the following using one of the following words (positive – negative – zero):**

a) Moving forward is represented by .... numbers, while moving backward is represented by .... numbers.

b) Moving from zero point to the right side is represented by .... numbers, while moving to the left side is represented by .... numbers.

c) Descending below the sea level is represented by .... numbers.

d) Moving high above the sea level is represented by .... numbers.

e) The sea level itself is represented by the number ....

2 **Write an integer to represent each situation of the following:**

a) A profit of L.E. 2500 ....

b) A bank withdrawal of L.E. 1000 ....

c) Someone is diving at the depth of 20 m. ....

d) The temperature is 10º C above zero. ....

e) Moving 30 metres forward. ....

f) A bank deposit of L.E. 5000 ....

g) Moving 56 metres backward. ....

h) 160 metres above the sea level. ....

i) The temperature is 7° C below zero. ....

j) A loss of L.E. 150 ....

3 **Represent each of the following numbers on the number line:**

a) –1, 0, 3, 4, 5

b) –3, –2, –1, 0, 1, 2, 3

c) 📖 6, –3, zero, –1, 3, 5

d) –2, –3, –4, ...

| withdrawal | سحب | bank deposit | إيداع بنكى | diving | الغطس |

4 📖 *Mark (true) or (false) and give the reason:*

a) Zero is a small positive number. ( ) because: ....

b) $\mathbb{Z} = \mathbb{Z}^+ \cup \mathbb{Z}^-$ ( ) because: ....

c) $\mathbb{Z}^+$ is the set of counting numbers. ( ) because: ....

d) $\mathbb{Z} = \mathbb{N} \cup \mathbb{Z}$ ( ) because: ....

e) $\mathbb{Z}^+ \cup \mathbb{Z}^- = \{0\}$ ( ) because: ....

---

5 📖 *Write each of the following sets using the listing method:*

a) Set of integers greater than –2.   b) Set of integers less than –5.

c) Set of integers between – 4 and 3.

d) Set of negative integers where the absolute value of each is greater than 4.

e) Set of negative integers.   f) Set of odd integers.

g) Set of negative even integers.   h) Set of integers between –3 and 13.

---

6 *Put the suitable sign ($\in$, $\notin$, $\subset$ or $\not\subset$):*

a) –9 .... $\mathbb{Z}$ b) $-\dfrac{49}{7}$ .... $\mathbb{N}$ c) $\mathbb{Z}^-$ .... $\mathbb{Z}$

d) $-\dfrac{35}{25}$ .... $\mathbb{Z}$ e) $\mathbb{Z}^+$ .... $\mathbb{N}$ f) Zero .... $\mathbb{N}$

g) $|-8|$ .... $\mathbb{N}$ h) Zero .... $\mathbb{Z}^-$ i) $\varnothing$ .... $\mathbb{Z}$

---

7 *Choose the correct answer:*

a) $\mathbb{Z}^+ - \mathbb{Z}^- = $ .... ($\varnothing$ or $\mathbb{N}$ or $\mathbb{N} - \{0\}$ or $\mathbb{Z}$) *(Giza 2017)*

b) $\mathbb{Z}^+ \cup \{0\} = $ .... ($\varnothing$ or $\mathbb{Z}^-$ or $\mathbb{Z}$ or $\mathbb{N}$) *(Cairo 2019)*

c) $\left|\dfrac{2}{3}\right| + \left|-\dfrac{1}{3}\right|$ .... $\mathbb{Z}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

d) If $x \subset \{2, -3\} \cap \{5, -3\}$, then $x = $ .... ($\{2\}$ or $\{-3\}$ or $\{-5\}$ or $\{5\}$)

e) $|-5| + 3 = $ .... $\mathbb{Z}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$) *(Alex. 2016)*

19

f) $|-5| + |7| =$ .... $(-12$ **or** 12 **or** -2 **or** $2)$ *(Cairo 2019)*

g) If $|-2| = x$, then $x =$ .... $(-2$ **or** 2 **or** zero **or** $4)$ *(Cairo 2017)*

h) $\mathbb{Z}^+ \cap \mathbb{Z}^- =$ .... $(\emptyset$ **or** $\mathbb{Z}$ **or** π **or** $\{0\})$ *(Alex. 2017)*

i) $\dfrac{13}{5}$ .... $\mathbb{Z}$ $(\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset)$

j) $\dfrac{6-6}{8}$ .... $\mathbb{Z}$ $(\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset)$

k) $|-9| + 3$ .... $\mathbb{Z}$ $(\in$ **or** $\notin$ **or** $\subset$ **or** $\not\subset)$ *(Assuite 2019)*

l) -7 .... $-|-9|$ $(>$ **or** $=$ **or** $<$ **or** $\leq)$ *(Damietta 2013)*

---

8   *Complete each of the following:*

a) $|-7| =$ .... *(Cairo 2011)*   b) $\mathbb{Z}^+ \cup \{5\} =$ ....

c) $\mathbb{Z}^+ \cap \mathbb{Z}^- =$ .... *(New Valley 2011)*   d) $\mathbb{Z} = \mathbb{Z}^+ \cup \cdots \cup$ ....

e) $\mathbb{Z}^+ \cup \mathbb{N} =$ .... *(Cairo 2019)*   f) $\mathbb{N} \cup \mathbb{Z}^- =$ ....

g) $\mathbb{Z} \cap \mathbb{N} =$ ....   h) $\mathbb{Z} - \{zero\} =$ ....

i) $|-2| + 2 =$ .... *(Cairo 2016)*   j) $\mathbb{Z} - \mathbb{Z}^- =$ ....

k) $\mathbb{Z}^+ - \mathbb{Z}^- =$ ....   l) The greatest negative integer is ....

m) .... is the smallest positive integer.   *(Minia 2019)*

---

9   *Find the result of each of the following:*

a) $|-3| + |5| =$ ....   b) $|3| \times |-2| =$ ....   c) $7 \times |-12| =$ ....

d) $|-45| \div |-9| =$ ....   e) $|-12| + |13| =$ ....   f) $|-7| - |7| =$ ....

---

10   📖 On the number line, colour each number of the following and its inverse with the same colour.

a) 6 b) -4 c) -9

11 📖 **Write the inverse of each of the following numbers:** 113, – 9, zero, 7, 8.

12 **Write the opposite (or inverse) of each integer:**

a) 📖 – 4   b) 16   c) –100   d) $| - 5 |$

e) 0   f) 📖 – 99   g) $| 6 |$ h) $- | - 3 |$

13 📖 **Determine the value of the integer (b) in each of the following cases:**

a) $| b | = 7$ b) $| b | = 16$ c) $| - 9 | = b$

14 **Find the value of (a) in each of the following cases:**

a) $| a | = 3$ b) $a + 2 = | - 8 |$ c) $| - 9 | = a$

d) $a = | - 9 | - 9$ e) $a = | - 5 | + 5$ f) $a = 12 \div | - 3 |$

Cumulative Exercise

15 **Find the value of x to get a true statement:**

a) 📖 $- 5 \in \{-1, 0, - 3, x\}$ b) $- 9 \in \{-1, - 5, x, -13\}$

c) $x \in \{5, - 3\} \cap \{5, 3\}$ d) 📖 $x \in \{2, 5, - 3\} \cap \{-5, - 2, -3\}$

e) $\{x\} \cap \{5, 8\} = \{ 8 \}$ f) 📖 $\{2, x\} \cup \{- 4, 0, 4\} = \{0, - 2, 2, - 4, 4\}$

g) $- 9 \in \{x, - 3\} - \{- 3, 7, 9\}$

🏆 THINK AND EXPLORE

16 If $| - 5 | \notin \{x , - 5 , 3\}$, find the value of x.

21

EXERCISE 2

Ordering and comparing integers

1 *Put the suitable sign (< , = or >) in each* .... :

a) 📖 3 .... –6

b) 📖 –7 17

c) 📖 | –13 | 3

d) 📖 | –5 | 5

e) 📖 3 + | –3 | 8

f) 📖 – | –4 | 2

g) zero .... | zero |

h) | –5 | – | –4 | 0

2 *Choose the correct answer:*

a) The integer number which is included between –2 and 3 is ....
(– 4 *or* – 3 *or* – 2 *or* –1)

b) | –2 | 1
(> *or* < *or* = *or* ≤)

c) 0 > ....
(– 6 *or* 0 *or* 1 *or* 2)

d) – 3 < ....
(– 5 *or* – 4 *or* – 3 *or* – 2)

e) – 6 .... – | – 8 |
(< *or* > *or* = *or* ≤)

f) The integer number just before – 5 is ....
(– 6 *or* – 4 *or* 4 *or* 6)

g) The number of integers which lie between –3 and 3 is ....
(3 *or* 4 *or* 5 *or* 6)

h) The integer number next to 23 is .... *(Sharkia 2015)*
(15 *or* 22 *or* 23 *or* 24)

i) The number of integers between –2 and 2 is ....
(2 *or* 3 *or* 4 *or* 5)

j) The greatest non-positive integer is .... *(Dakahlia 2015)*
(1 *or* – 1 *or* 0 *or* million)

3 *Write the integers between each two integers of the following:*

a) 📖 –4 , 2

b) 📖 –1 , 5

c) 📖 –7 , zero

d) –2 , –5

e) | –1 | , –3

f) | –2 | , | –9 |

4 📖 *Write the previous and the next integer for each of the following:*

a) –9

b) 13

c) 23

d) zero

5 Write each of the following sets using the listing method, then represent it on the number line:

a) The set of integers less than 2

b) The set of integers greater than –2

c) B = $\{ x : x \in \mathbb{Z} , -5 \leq x < 1 \}$

d) C = $\{ x : x \in \mathbb{Z} , -3 \leq x \leq 3 \}$

6 📖 Write each of the following sets using the listing method:

a) X = $\{ x : x \in \mathbb{Z} , x < -3 \}$

b) X = $\{ x : x \in \mathbb{Z} , x \leq -2 \}$

c) X = $\{ x : x \in \mathbb{Z} , -1 \leq x < 5 \}$

d) X = $\{ x : x \in \mathbb{Z} , -5 < x < zero \}$

e) The set of integers greater than – 5 and smaller than 4.

f) The set of integers between – 2 and 5.

g) The set of non-positive odd integers.

h) The set of integers greater than – 3.

7 Represent each of the following numbers on the number line, then arrange them:

a) $- 3 , | - 7 | , 0 , 5$ and $- 5$ (ascendingly)

b) $| - 4 | , 9 , - 2 , -3$ and 1 (descendingly)

8 Which of the following integers is listed in ascending order......?

a) $- 30 , - 25 , - 20$

b) $0, 3, 5, 7$

c) $26 , 24 , 22$

d) $- 7 , - 5 , | - 9 | , 0 , 14$

9 Which of the following integers is listed in descending order......?

a) $0 , -7 , - 14 , - 21$

b) $19 , 17 , 15$

c) $- 2 , - 6 , - 10$

d) $- 11 , - 13 , - 15$

10 Arrange the following numbers in ascending order:

a) 📖 $6 , - 60 , 2 , -17 , - 22$ and 0

b) $1 , - 9 , - 45 , 7 , 19$ and 30

c) $27 , - 60 , 50 , -38 , | - 20 |$ and zero

d) $-17 , -11 , 0 , 5 , | -3 |$ and $| 4 |$

11 *Arrange the following numbers in descending order:*

a) 📖 1 , –11 , 3 , –1 , –8 and 5

b) 60 , –60 , –70, –50, | 70 | and –8

c) –8 , –9 , 7 , 15 , | –12 | and | –3 |

d) | –7 | , 8 , | –9 | , zero , –8 and 17

12 *Each of the following integers increases by a constant value, determine this constant value and complete the pattern:*

a) – 10 , – 9 , – 8 , ……… , ……… , ………

b) 📖 – 50 , – 40, – 30 , ……… , ……… , ………

c) 📖 – 2 , 0, 2 , 4 , ……… , ……… , ………

d) 📖 – 7, – 6 , – 5 , ……… , ……… , ………

13 *Complete in the same pattern:*

a) – 15 , – 14 , – 13 , ……… , ………

b) – 12 , – 15 , – 18, ……… , ………

c) – 10 , – 12 , – 14 , ……… , ………

d) – 30 , – 20 , – 10 , ……… , ………

e) – 25 , – 20 , – 15 , ……… , ………

f) – 6 , – 3 , 0 , 3 , ……… , ………

Cumulative Exercise

14 *Complete by using (> , = or <):*

a) $15 + | – 15 |$ ……… the opposite of 15

b) $| – 17 | – 7$ ……… the opposite of $– | – 12 | + 5$

c) The value of x where $x + 2 = | – 5 |$ ……… – 13

THINK AND EXPLORE

15 If the temperature recorded in one city is $3^{o}C$

and in another city is $(– 7)^{o}C$

Calculate the difference between the temperatures of the two cities.

Information from UNICEF

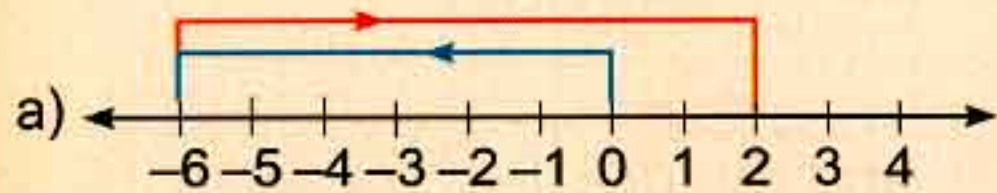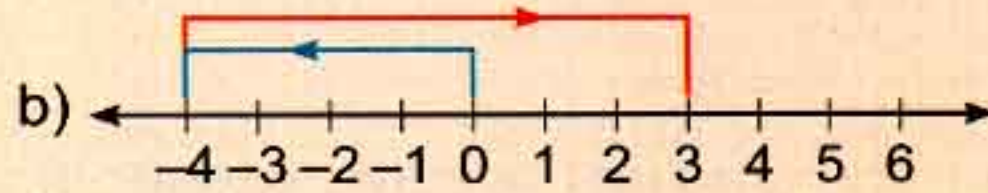I help my family prepare food at home. I prefer home-made food to fast food.

EXERCISE 3
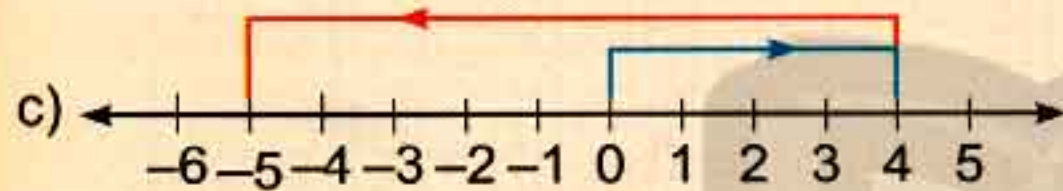
Adding and subtracting integers

1 **By using the number line, complete the following:**

a)

$(-6) + 8 =$ ....

b)

$(-4) + 7 =$ ....

c)

$4 + (-9) =$ ....

d)

$(-2) + (-4) =$ ....

e)

$6 - (-4) =$ ....

f)

$-3 - (-5) =$ ....

g)

.... + ... = ...

h)

.... + ... = ...
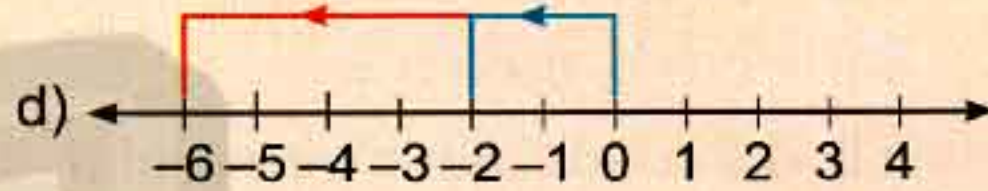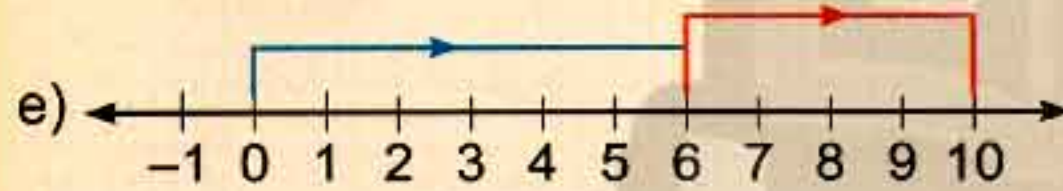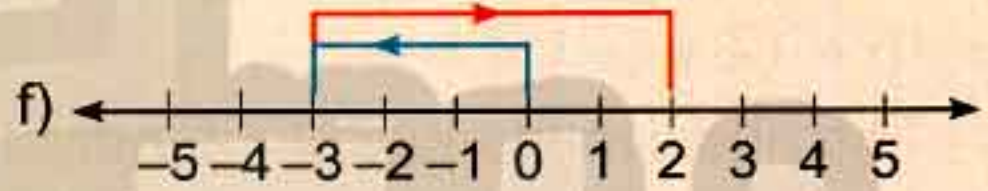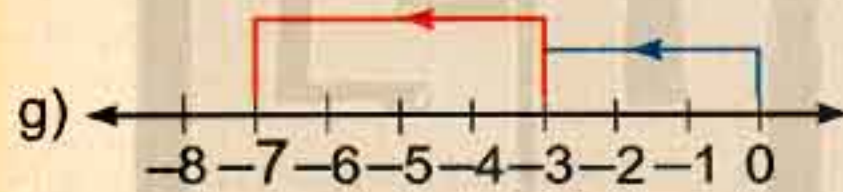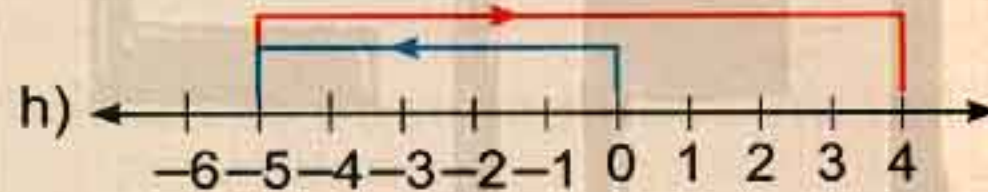
2 **Use the number line to find the sum of each of the following:**

a) $3 + 4$　　　　　b) $(-7) + 5$　　　　　c) $5 + (-1)$

d) $2 + (-7)$　　　　e) $3 - 5$　　　　　　f) $3 - (-7)$

3 **Find the result of each of the following:**

a) $9 + (-5)$

b) $(-8) + (-2)$

c) $(-16) + 14$

d) Zero $+ (-3)$

e) $(-15) + (-10)$

f) $20 + (-30)$

g) $|-15| + |-9|$

h) $-|-22| + 15 + 27$

i) $-24 + |-17| + (-9)$

j) $(-11) + (-12) + (-35)$

4 **Complete each of the following:**

a) $3 + (-2) = (-2) +$ .... (............. property)

b) $[5 + (-3)] + 2 = 5 + ($ .... $+ 2)$ (............. property)

c) $5 +$ .... $= 5$ (............. property)

d) $(-2) + 8 =$ ....

e) The smallest positive integer is .... and the greatest negative integer is ....

f) If $a + (-5) = b + a$, then $b =$ ....

g) If $a + b = b$, then $a =$ ....

h) If b is the additive inverse of a, then $a +$ .... $= 0$

i) $6 + (-11) =$ ....

j) $(3 + (-5)) + 7 =$ .... $+ ((-5) + 7)$

k) $15 + 17 + (-15) =$ ....

l) The additive identity of integer numbers is ....

m) The additive inverse of zero is ....

n) The additive inverse of (-3) is ....

5 **Find the result of each of the following:**

a) $3 - 8$

b) $(-9) - 4$

c) $(-2) - (-5)$

d) $-7 - 0$

e) $0 - (-10)$

f) $0 - 6$

g) $(-25) - (-11)$

h) $|-7| - (-9)$

i) $19 - |-9|$ *(Garbia 2016)*

6 **Choose the correct answer:**

a) $\left| \dfrac{6-8}{2} \right| =$ .... (2 *or* -2 *or* 1 *or* -1)

b) $3 - |-3| =$ .... (0 *or* 1 *or* 3 *or* 6) *(Giza 2019)*

c) If $a = -2$, $b = -5$, then $a - b =$ .... (-3 *or* 3 *or* 5 *or* -5)

d) If $x = -5$, then $x - (-11) =$ .... (-5 *or* 5 *or* 6 *or* -6)

e) The result of subtracting (-9) from (-7) is .... (2 *or* -2 *or* 1 *or* -1)

f) The result of subtracting (-8) from (-4) is .... (2 *or* 4 *or* -4 *or* 6)

g) The result of subtracting (-9) from 3 is .... (2 *or* 21 *or* 12 *or* -12)

h) The result of subtracting (-8) from (-12) is .... (4 *or* 8 *or* -4 *or* 14)

7 *Choose the correct answer:*

a) $-|2-3| =$ .... (-1 *or* 1 *or* -5 *or* 5) *(Ismailia 2017)*

b) $4 + (-6) >$ .... (2 *or* 0 *or* -2 *or* -4)

c) The additive inverse of (-5) is .... (-10 *or* -5 *or* 5 *or* 0)

d) $|-5| +$ .... $=$ zero (-5 *or* 5 *or* 1 *or* 0)

e) $51 + |-4| =$ .... (52 *or* 53 *or* 54 *or* 55)

f) $\left| \dfrac{5-11}{3} \right| =$ .... $\mathbb{Z}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$) *(Giza 2019)*

g) $15 + 8 - 15 =$ .... (-15 *or* 8 *or* 15 *or* 23)

h) $-1 + 5 =$ .... (4 *or* -4 *or* 8 *or* -8)

i) Zero $+ (-3) =$ .... ($\frac{1}{3}$ *or* -3 *or* 1 *or* Zero)

8 *Write the missing number:*

a) $15 +$ .... $= 0$

b) Zero $+$ .... $= -3$

c) $7 -$ .... $= 10$

d) .... $+ 9 = -2$

9 *Complete using the suitable sign* $\in$, $\notin$, $\subset$ *and* $\not\subset$:

a) 📖 $|-9| + 3$ .... $\mathbb{Z}$

b) 📖 $\{9\}$ .... $\mathbb{Z}$

c) 📖 $\dfrac{3}{5}$ .... $\mathbb{Z}$

d) 📖 $\dfrac{9}{7+7}$ .... $\mathbb{Z}$

e) 📖 $\dfrac{6-6}{8}$ .... $\mathbb{Z}$

f) 📖 $\left\{ -3 , \dfrac{7}{11} \right\}$ .... $\mathbb{Z}$

g) $\dfrac{7+3}{5+25}$ .... $\mathbb{Z}$

h) $\dfrac{20}{(-5)+10}$ .... $\mathbb{Z}$

i) $\dfrac{-8+|8|}{3}$ .... $\mathbb{Z}$

10 *Put (✓) or (✗):*

a) $\mathbb{Z}$ is closed under addition operation. (   )

b) The operation of addition is commutative in $\mathbb{Z}$. (   )

c) The operation of addition is not associative in $\mathbb{Z}$. (   )

d) The additive identity in $\mathbb{Z}$ is one. (   )

e) For every $a \in \mathbb{Z}$, then $(-a) \in \mathbb{Z}$, where $a + (-a) =$ zero. (   )

41

11 **Use the properties of addition operation in $\mathbb{Z}$ to get the result of each of the following: (State the property.)**

a) $(-77) + (19) + 17$ *(Kafr El-Sheikh 2017)*

b) 📖 $115 + 198 + (-115)$

c) $23 + (-17) + (-23)$

d) $(-15) + 29 + 15$ *(Sohag 2017)*

e) $225 + 17 + (-25) + 83$

f) $55 + (-225) + 45 + 225$

g) $27 + 157 + (-27) + (-57)$

h) $26 + 20 + (-26) + 80$ *(Minia 2019)*

i) 📖 $-120 + 17 + |3|$

j) 📖 $2015 + 180 + (-1015)$

---

12 **Check the closure property of the addition and subtraction operations in each of the following sets:**

a) $\{2, 7, -2\}$

b) $\{-5, 3, 5\}$

c) $\{-2, 0, 2\}$

d) $\{-1, 3, 5, -7\}$

e) $\{2, -1, -2, 9\}$

f) $\{-3, -2, 1, 0, 5, 6\}$

g) 📖 $X = \{-1, 0, 1\}$

h) $L = \{-2, 0, 2\}$

i) 📖 $L = \{-2, -1, 0, 1, 2\}$

j) $M = \{-3, -2, 0, 1, 2\}$

---

13 **First: If $A = 2$, $B = -5$ and $C = -1$, find the result of each of the following:**

a) $A + B$

b) $B + C$

c) $A + C$

d) $A + B + C$

Second: If $M = -2$, $N = -5$ and $L = 3$, find the result of each of the following:

a) $M + N + (-L)$

b) $M - N - L$

Cumulative Exercises

14 **Find the value of x in each of the following:**

a) $|-5| + 0 = x$

b) $(-4) + x = -4$

c) $(-3) + (-9) = x$

d) $x + 5 = 0$

e) $3 + x = 8$

f) $(-2) + x = -10$

---

15 📖 Ramy had deposited L.E. 6220 in the bank then he withdrew an amount of L.E. 1211, afterwards Ramy deposited another amount of L.E. 2110.
How much is Ramy's credit in the bank?

42

16 📖 A submarine at a depth of 90 metres below the sea level went up 60 metres. Use the appropriate calculation to calculate the new depth of the submarine.

17 📖 The temperature recorded in St. Catherine is − 3º C at three o'clock after midnight, while it was 11º C in the afternoon. Calculate the increase in the temperature.

18 The minimum temperature recorded in Paris, is (− 5)º C, while the maximum temperature is 12º C, find the amount of increase.

🏆 THINK AND EXPLORE

19 1ˢᵗ: Consider the counting triangles at the following figures, then find the sum of each of the following:

a) △△▲△△ = ...

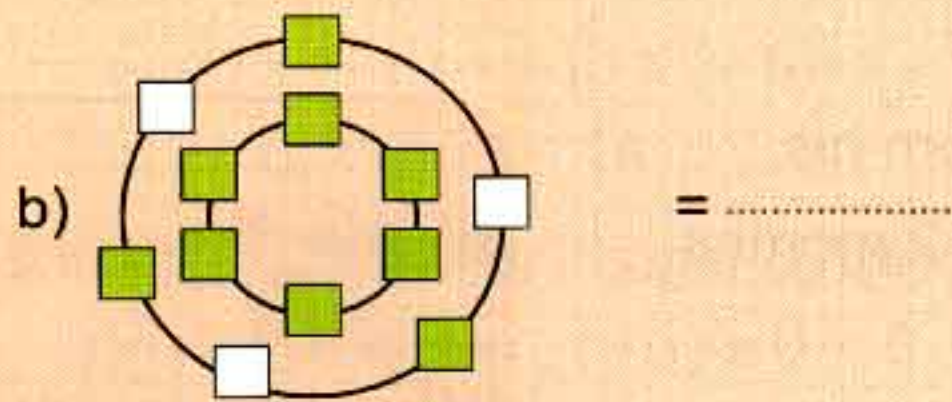b) △▽△▽△▽△ = ...
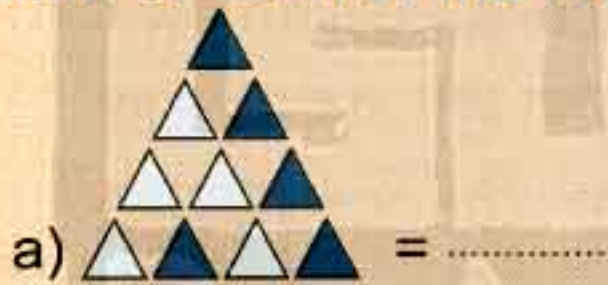
2 = ▲	Red triangle
− 2 = △	White triangle
Zero = ▲△	Both of the two triangles

2ⁿᵈ: Consider the counting squares at the following figures, then find the sum of each of the following:

a) = ...

b) = ...

2 = 🟩	Green square
− 2 = ⬜	White square
Zero = 🟩⬜	Both of the two squares

Multiplying and dividing integers

EXERCISE 4

1 Find the result of each of the following:

a) $(-7) \times 3$

b) $3 \times (-8)$

c) zero $\times (-7)$

d) $(-6) \div 2$

e) $(-5) \times |-4|$ *(Cairo 2019)*

f) $-|-6| \times |-3|$

g) $|-12| \times 9$

h) $|0| \div |5|$

i) $[9 + (-5)] \times (-2)$ *(Cairo 2017)*

j) $(-4) \times [(4) + (-5)]$ *(Damietta 2016)*

k) $28 \div (-7)$

l) $-|-4| \times -|-28|$

m) $(-35) \div 7$

n) $(-24) \div (-8)$

2 Choose the correct answer:

a) $(-36) \div (-4) = $ .... $\quad (-9$ *or* 9 *or* 6 *or* $-6)$

b) $(-32) \div 8 = $ .... $\quad (-4$ *or* 4 *or* 8 *or* $-8)$

c) $72 \div (-6) = $ .... $\quad (-12$ *or* 12 *or* 6 *or* $-6)$

d) If $x = -12$, $y = 3$, then $x \div y = $ .... $\quad (1$ *or* -4 *or* 4 *or* $16)$

e) $0 \div (-12) = $ .... $\quad (-12$ *or* 12 *or* 0 *or* has no meaning$)$

3 Complete the following and mention the property which is used:

a) $(-15) \times 1 = $ .... property

b) $[5 \times (-7)] \times 8 = $ .... $\times [(-7) \times 8]$ .... property

c) $(-8) \times 2 = 2 \times $ .... property

d) .... $\times (-2) = $ zero .... property

e) $(-3) \times [5 + $ ...... $] = (-3) \times $ .... $+ (-3) \times 2$ .... property

4 **Complete, given that $a \in \mathbb{Z}$, $b \in \mathbb{Z}$ and $c \in \mathbb{Z}$:**

a) $b \times$ .... $= a \times$ .... property

b) $(a \times$ .... $) \times c =$ .... $\times (b \times c)$ .... property

c) $a \times$ .... $=$ .... $\times a = a$ .... property

d) $a \times$ .... $=$ .... $\times a = $ zero .... property

e) $a \times (b +$ .... $) = a \times$ .... $+$ .... $\times c$ .... property

---

5 **Complete the following:**

a) $5 \times$ .... $=$ zero

b) $|-25| \times$ .... $= 25$

c) The quotient of $(-36) \div (-9) =$ ....

d) $|-24| \div (-8) =$ ....

e) If $x = -2$, $y = 3$, then the value of $4xy =$ ....

f) $-|-24| \div$ .... $= 4$

g) $(-5 + 3) \div 2 =$ ....

h) If $\dfrac{x}{3} = 5$, then $x =$ ....

i) If $x = 6$ and $y = 2$, then $\dfrac{x}{y} =$ ....

j) zero $\times (-11) =$ ....

k) $5 \times (-4) =$ ....

l) $|-3| + 3 \times 5 =$ .... *(Giza 2019)*

m) $(-131) \times (-3) =$ ....

n) $-(-6) \times (-2) =$ ....

o) $(2 \times 15) \div (-5) =$ ....

p) $[(-32) \div (-4)] \div (-2) =$ ....

q) $12 - [42 \div (-6)] =$ ....

r) $[48 \div (-6)] + 5 =$ ....

---

6 **Complete the following:**

a) Multiplying any integer by zero equals ....

b) The product of a negative integer and a positive integer is a .... integer.

c) The product of two positive integers or two negative integers is a .... integer.

d) The multiplicative neutral element in $\mathbb{Z}$ is ....

e) If $x \times y = x$ and $x \neq 0$, then $y =$ ....

f) If $x \times (y + z) = 0$ and $x \neq 0$, then $y + z =$ ....

55

7 *Choose the correct answer:*

a) $(-2) \times (-3) = $ ....   (-6 *or* -5 *or* -1 *or* 6)

b) $-5 \times $ .... $= 15$ (20 *or* 10 *or* 3 *or* -3)

c) $-7 \times $ .... $= 0$ (0 *or* 1 *or* 7 *or* 10)

d) .... $\times -9 = -9$ (0 *or* 1 *or* 9 *or* 10)

e) .... $\times 6 = 8 \times -3$ (8 *or* 4 *or* -3 *or* -4)

f) If $a = 5$, $b = -2$, then $ab = $ ....   (10 *or* -10 *or* 3 *or* -3)

8 *Write the suitable sign (< , = or >) in* .... :

a) $25 \times (-4)$ .... $25 \times |-4|$

b) -5×100 .... $-5 \times |-100|$

c) $|-10| \times 70$ .... $30 \times |-10|$

d) $[27 + (-27)] \times 8$ .... $[|15| + (-16)] \times |-8|$

e) $(-15) \div 3$ .... -7

f) $(-48) \div 8$ 9

g) (-8) .... $(-49) \div 7$

h) $(-63) \div 9$ .... $18 \div 3$

i) $72 \div 8$ .... $|-80| \div 10$

j) $|-35| \div 5$ .... $49 \div |-7|$

k) $(-66) \div |-6|$ .... $30 \div 5$

l) $|-81| \div 9$ .... $|-54| \div 6$

9 *Find the value of x in each of the following (Where $x \in \mathbb{Z}$):*

a) 📖 $8 \times x = -48$ b) 📖 $x \times 9 = -45$

c) $x \times 9 = (-72)$ d) $(-2) \times 4 = x \times (-2)$

e) 📖 $x \times [5 \times (-13)] = [(-9) \times 5] \times (-13)$ f) $x \times (7 \times 8) = [(-9) \times 7] \times 8$

g) $x \times (3 + 5) = (-12) \times 3 + (-12) \times 5$ h) $5 \times |-17| = 5 \times (x + 7)$

i) $2|x| = 6$ j) $5 \times |-7| = 5 \times |x + 1|$

k) $-7x = 28$ l) $(-32) \div x = -4$

m) $|x \div (-2)| = 8$ n) $x \times (9 + 5) = [(-4) \times 9] + [(-4) \times 5]$

10 Use the properties of multiplication in $\mathbb{Z}$ to find:

a) $4 \times (-16) \times 25$

b) $50 \times (-27) \times 2$

c) $-5 \times 77 \times 20$

d) $2 \times 125 \times (-5) \times 8$

11 Use the distributive property to find:

a) $4 \times (-3) + 4 \times 5$

b) $(-6) \times (-7) + 2 \times (-6)$

c) $143 \times 69 - 43 \times 69$

d) $115 \times 98 + 115 \times (-97)$

e) $102 \times 15 + 102 \times (-15)$

f) $35 \times 18 - 35 \times 34 + 35 \times 17$

g) 34×102

h) 24×97

i) 54×113

j) $(-14) \times 99$

12 Find the result of each of the following in two methods:

a) $(-7) \times (17 + 3)$

b) $15 \times (8 - 18)$

c) $6 \times [(-2) + (-7)]$

d) 📖 $6 \times [(-6) + 0]$

e) $[(-5) + 3] \times 10$

f) $[8 + (-5)] \times 6$

g) 📖 $(-4) + [4 + (-1)]$

h) 📖 $[5 + (-3)] \times (-11)$

Cumulative Exercise

13 First: If $a = 21$, $b = -3$ and $c = 7$, calculate the value of each of the following:

a) $(a \div b) \times c$

b) $(b \times c) \div a$

c) $a \div (c \times b)$

d) $(2a \div 7) \div b$

Second: a) If $x = 2$, $y = 1$ and $z = 5$, find the value of: $3x - 2y + z$

b) If $x = 3$, $y = -1$ and $z = -2$, find the value of: $(2x \div y) \times 3z$

c) If $x = 8$, $y = -2$, find the value of: $x - 2y \div 4$

🏆 THINK AND EXPLORE

14 If $x \in \mathbb{Z}$ and $3|x| \div (-2) = x - 5$, then find the value of x.

EXERCISE 1
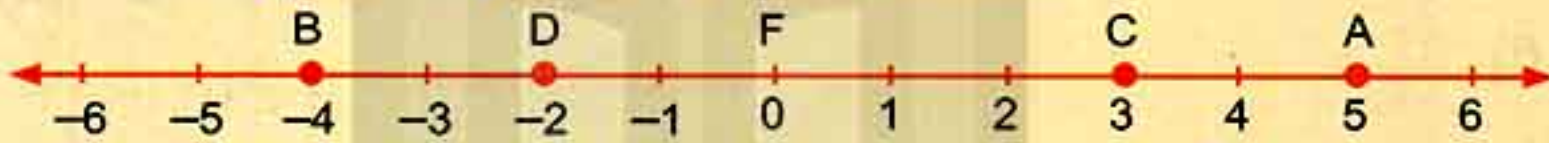
Distance between two points on the coordinate plane

1 Calculate the distance between the two points A and B on the following straight line:

A at −2, B at 5 on number line from −3 to 7.

2 Calculate the distance between the two points D and E on the following straight line:

E at −5, D at −2 on number line from −6 to 4.

3 On the following straight line, calculate:

B at −4, D at −2, F at 0, C at 3, A at 5 on number line from −6 to 6.

a) The distance between A and B.   b) The distance between D and C.

c) The distance between C and B.   d) The distance between D and F.

4 Using the following figure which represents the number line of integer, complete as in (a):

D at −5, C at −2, F at 0, B at 3, A at 6 on number line from −6 to 6.

a) The length of $\overline{AB}$ = $\left|3 - 6\right|$ = $\left|-3\right|$ = 3 length units.

b) The length of $\overline{AC}$ = $\left|\rule{1.5cm}{0pt}\right|$ = $\left|\rule{1.5cm}{0pt}\right|$ = ... length units.

c) The length of $\overline{DA}$ = $\left|\rule{1.5cm}{0pt}\right|$ = $\left|\rule{1.5cm}{0pt}\right|$ = ... length units.

d) The length of $\overline{DB}$ = $\left|\rule{1.5cm}{0pt}\right|$ = $\left|\rule{1.5cm}{0pt}\right|$ = ... length units.

e) The length of $\overline{DF}$ = $\left|\rule{1.5cm}{0pt}\right|$ = $\left|\rule{1.5cm}{0pt}\right|$ = ... length units.

f) The length of $\overline{DC}$ − the length of $\overline{BA}$ = $\left|\rule{1cm}{0pt}\right|$ − $\left|\rule{1cm}{0pt}\right|$ = $\left|\rule{1cm}{0pt}\right|$ − $\left|\rule{1cm}{0pt}\right|$

= ...... length units.

g) The length of $\overline{DC}$ + the length of $\overline{FB}$ = $\left|\rule{1cm}{0pt}\right|$ + $\left|\rule{1cm}{0pt}\right|$ = $\left|\rule{1cm}{0pt}\right|$ + $\left|\rule{1cm}{0pt}\right|$

= ...... length units.

5 Using the opposite figure complete:

a) The length of $\overline{AD}$ = $\left|\underline{\hspace{2cm}}\right|$ = $\left|\underline{\hspace{1.5cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

b) The length of $\overline{AF}$ = $\left|\underline{\hspace{2cm}}\right|$ = $\left|\underline{\hspace{1.5cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

c) The length of $\overline{FD}$ = $\left|\underline{\hspace{2cm}}\right|$ = $\left|\underline{\hspace{1.5cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

d) The length of $\overline{FD}$ + the length of $\overline{BF}$ = $\left|\underline{\hspace{1cm}}\right|$ + $\left|\underline{\hspace{1cm}}\right|$

$\qquad$ = $\left|\underline{\hspace{1cm}}\right|$ + $\left|\underline{\hspace{1cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

e) Is the length of $\overline{CD}$ equal to the length of $\overline{BF}$?

f) The length of $\overline{CF}$ = $\left|\underline{\hspace{1cm}}\right|$ = $\left|\underline{\hspace{1cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

g) The length of $\overline{AB}$ + the length of $\overline{CD}$ = $\left|\underline{\hspace{1cm}}\right|$ + $\left|\underline{\hspace{1cm}}\right|$

$\qquad$ = $\left|\underline{\hspace{1cm}}\right|$ + $\left|\underline{\hspace{1cm}}\right|$ = $\underline{\hspace{1cm}}$ length units.

6 Using the opposite figure answer the following:
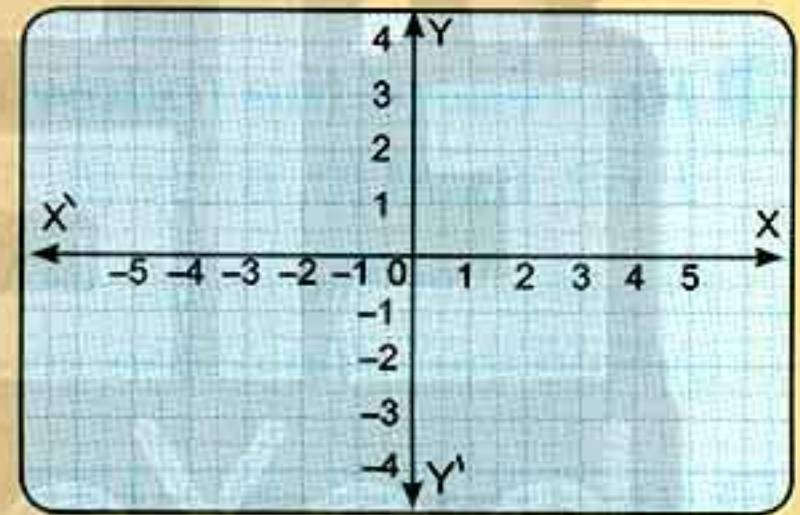
a) Determine the points A, B, C and D, where
A (0, 3), B (–2, 0), C (0, –3) and D (2, 0).

b) The length of $\overline{AC}$ = $\underline{\hspace{2cm}}$

$\qquad$ = $\underline{\hspace{2cm}}$ length units.

c) The length of $\overline{DB}$ = $\underline{\hspace{2cm}}$

$\qquad$ = $\underline{\hspace{2cm}}$ length units.

d) What is the name of the shape ABCD?
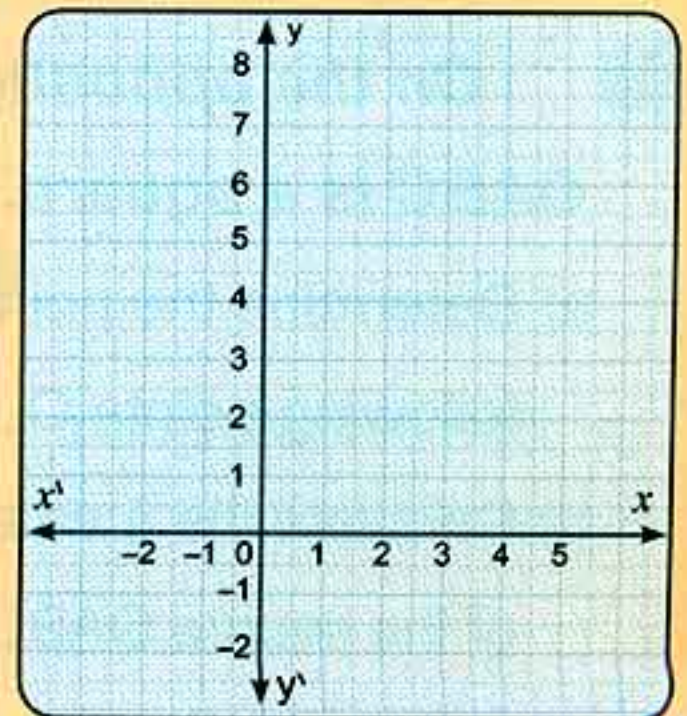
e) Find the area of the shape ABCD.

7 On the opposite coordinate plane:

a) Determine the points L (–1, 1),
M (1, 1), N (1, 8) and K (–1, 8).

b) Find the perimeter and area of
the shape LMNK.

c) Determine whether the shape
is symmetric or not and say why?

8 **Using the opposite figure answer the following:**

a) Determine the points A (2, 4), B (2, –2)
, C (–2, –2) and D (–2, 4).

b) *Complete:*

The length of $\overline{AB}$ = |—————| = |————|

= ———— length units.

The length of $\overline{BC}$ = |—————| = |————|

= ———— length units.

The length of $\overline{CD}$ = |—————| = |————| = ———— length units.

The length of $\overline{DA}$ = |—————| = |————| = ———— length units.

c) What is the name of the shape ABCD?

d) Find the area of the shape ABCD.
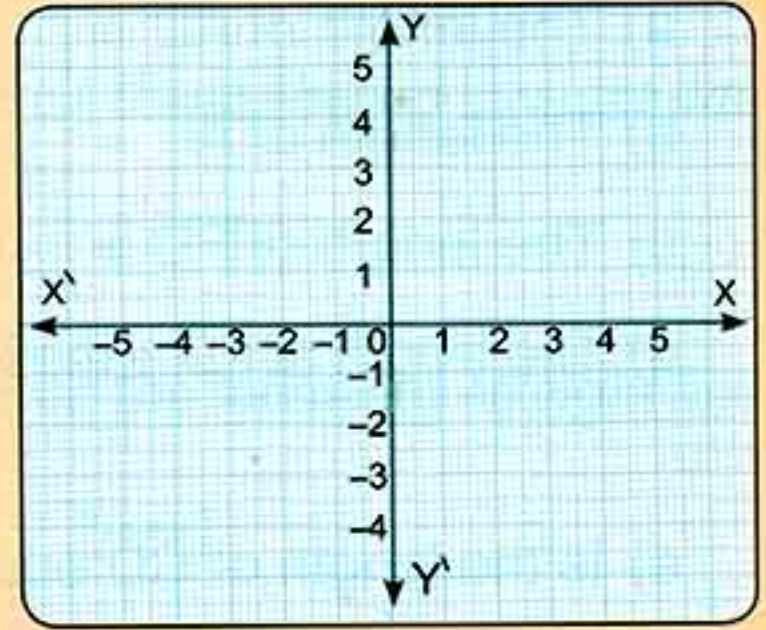
9 **Represent the following points:**

L (-2, 6), M (0, 6), N (5, 11) and K (-2, 11) on the coordinate plane.

a) Calculate the length of $\overline{ML}$, $\overline{NK}$.   b) What is the name of the shape LMNK?

c) Find the area of the shape LMNK.

10 **Find the length of $\overline{AB}$ in each of the following:**

a) A (-2, 5), B (4, 5)   b) A (3, 7), B (8, 7)

c) A (-6, 2), B (-4, 2)   d) A (13, 8), B (-5, 8)

11 📖 **On the opposite coordinate plane:**

OABC is a square.

a) Determine the points of each of the

following points O, A, B and C.

b) Calculate the area and the perimeter

of the square OABC.
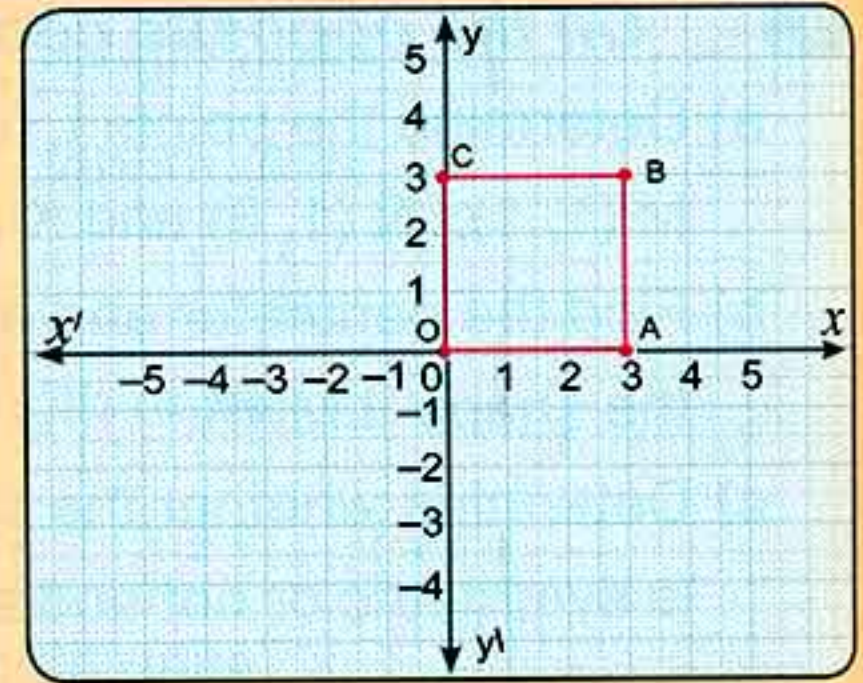
12 📖 On the opposite coordinate plane:
ABCD is a rhombus.

a) Complete the following:

A (............, ...) and B (............, ...).

C (............, ...) and D (............, ...).
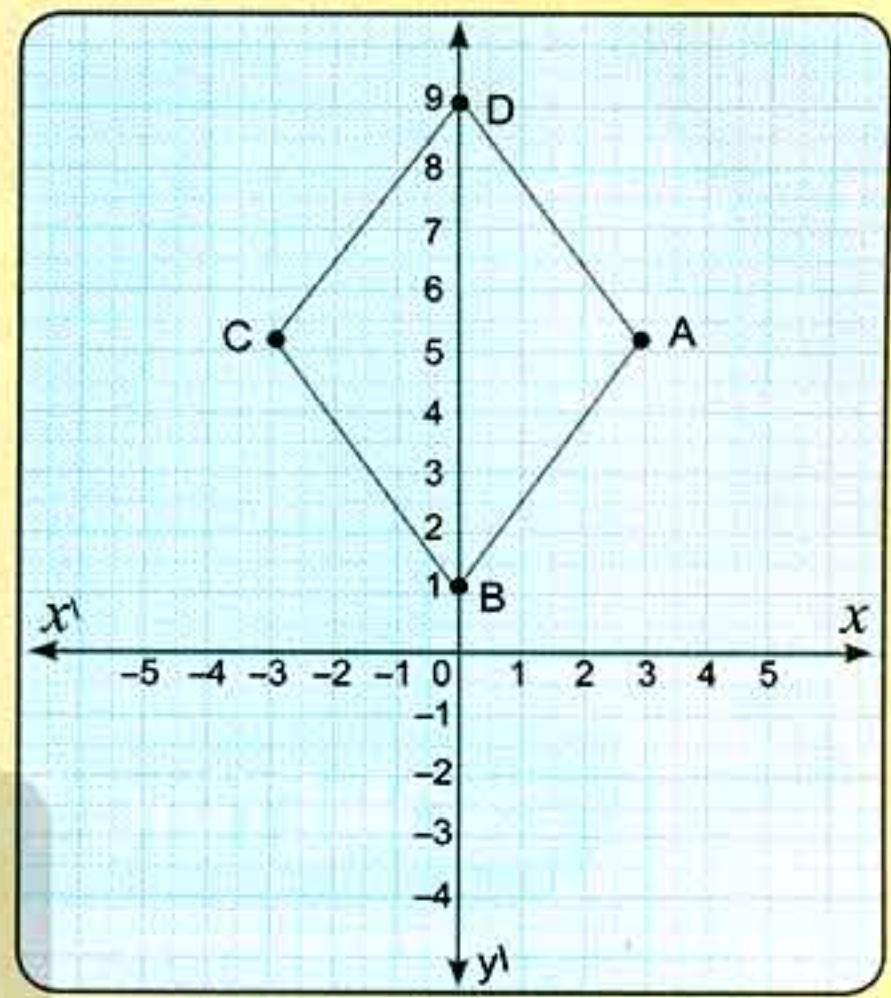
b) The area of the rhombus can be
calculated by using the lengths of its two
perpendicular diagonals, where:

AC = $\left|\text{............}\right|$ = $\left|\text{............}\right|$ = ... length units.

BD = $\left|\text{............}\right|$ = $\left|\text{............}\right|$ = ... length units.

The area of the rhombus = $\frac{1}{2}$ x .... x .... = ... square units.

Cumulative Exercise

13 In the opposite coordinate plane:
Determine the position
of the following points:
A (3 , 4), B (-4 , 4) and C (3 , -2)
then find:

1) The length of $\overline{AB}$ And $\overline{AC}$.

2) What is the type of the triangle
ABC with respect to its sides
and its angles.

3) The area of the triangle ABC.
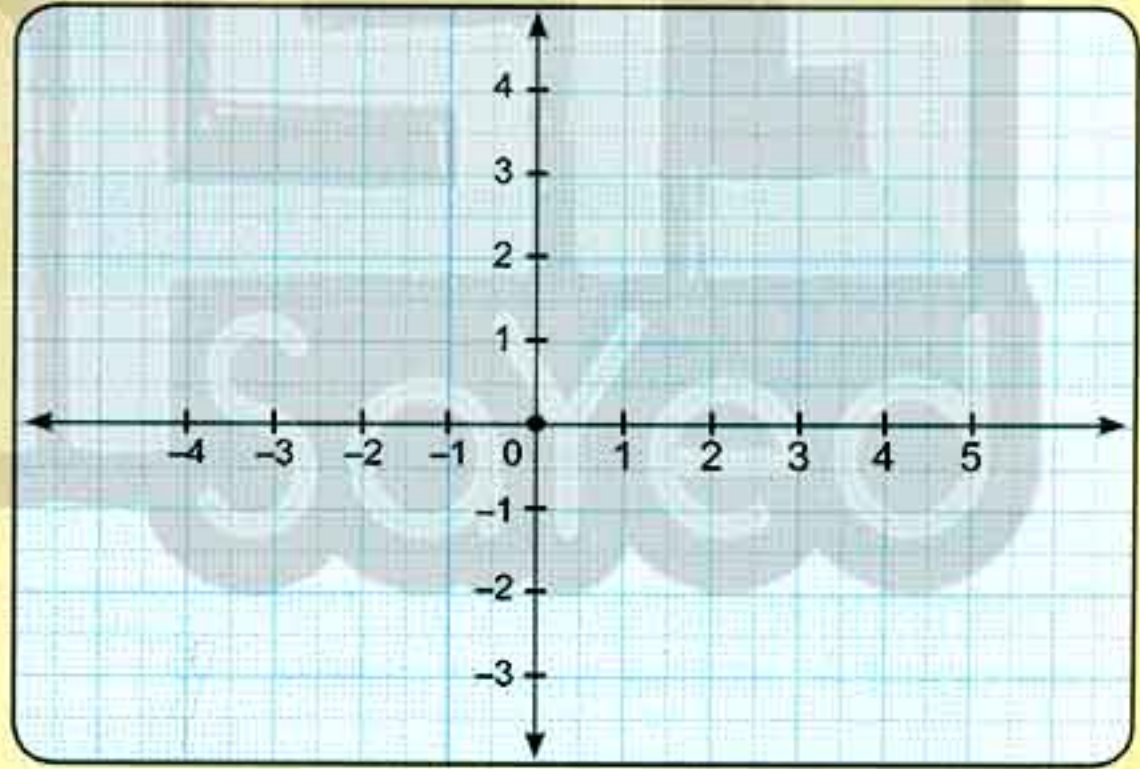
Think and Explore

14 In the coordinate plane, the triangle ABC is right- angled triangle where A (5 , 4) ,
B (5 , 2) and C (–1 , K), if its area units = 6 square units, then find the length
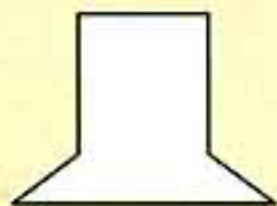of $\overline{BC}$ and the value of K.

(129)

EXERCISE 2

Geometric Transformation (Translation)

1 Determine which of the following shapes is symmetric and which is not symmetric, then draw the axis of symmetry (if it exists):
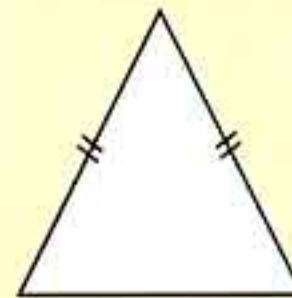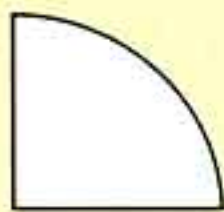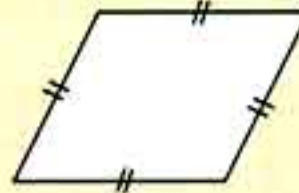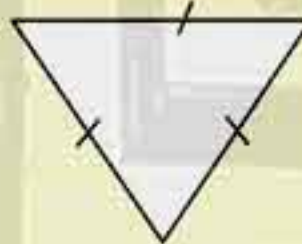
a)

b)

c)

d)

e)

f)

g)
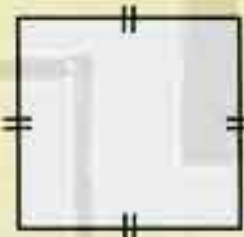
h)
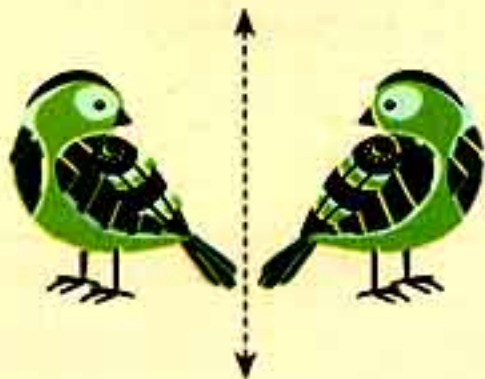
i)

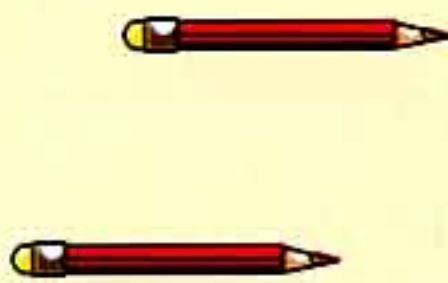**2** In the following pictures determine the type of geometric transformations:

a)

b)

c)

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى
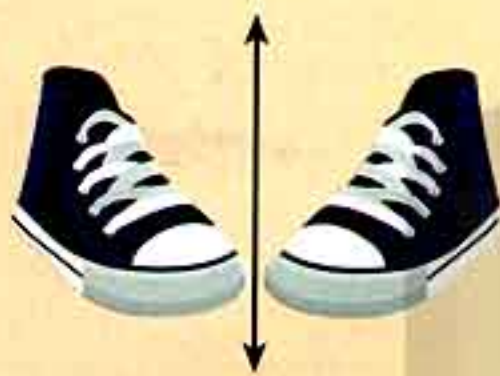
Gem كتاب | موقع ذاكرولى التعليمى | الصف السادس الابتدائى
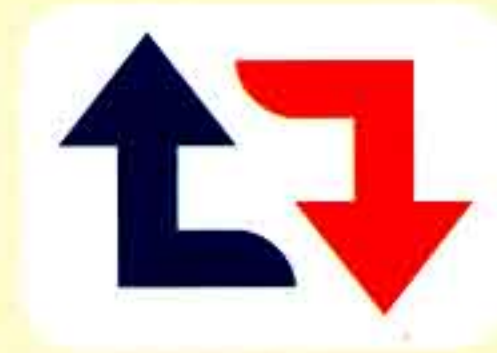
d)

....
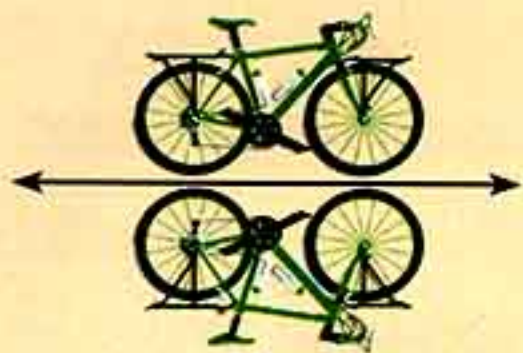
e)

....

f)

....

g)

....

h)

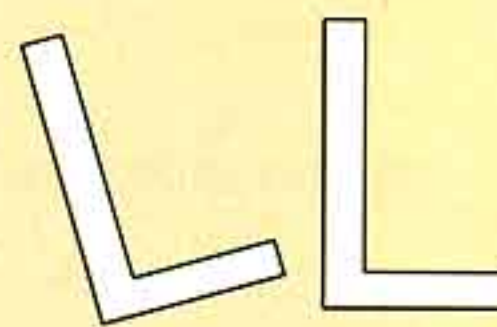......................

i)

....

3 📖 **Using the following figures, find:**

a) The image of N by translation ME (as magnitude) in the direction of $\overrightarrow{ME}$.

b) The image of $\overline{AB}$ by a translation of 3 cm in the direction of $\overrightarrow{DE}$.

1)
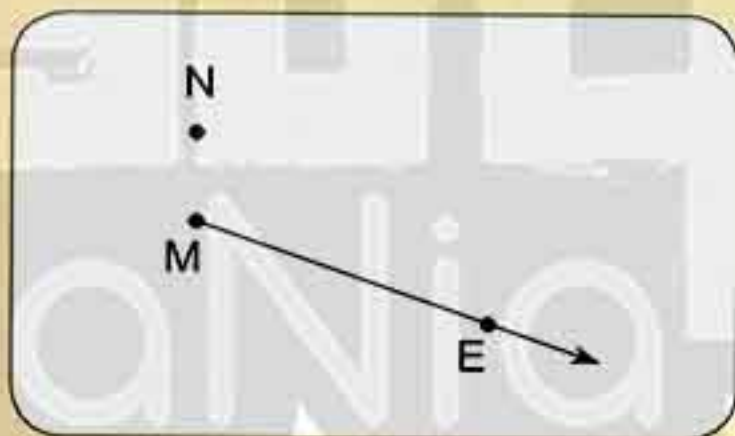
2)
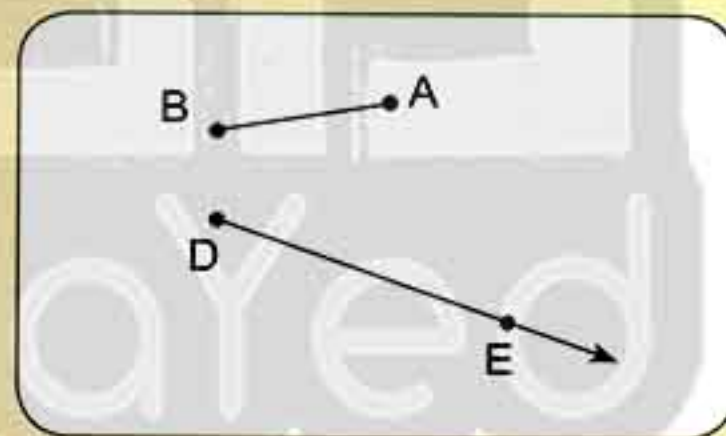
4 📖 **Complete the following table:**

	The point	The translation	The image
a)	(3 , 2)	$(x + 3 , y + 1)$	(...... , ...)
b)	(...... , ...)	$(x + 2 , y - 1)$	(-3 , 3)
c)	(1 , 3)	$(x - ...... , y - ......)$	(0 , 0)
d)	(-4 , -1)	$(x + 3 , y + 1)$	(...... , ...)

direction   اتجاه

5 **Choose the correct answer:**

a) The number of the axes of symmetry of an isosceles triangle is ....

(1 *or* 2 *or* 3 *or* 4)

b) The number of the axes of symmetry of a square is ....

(1 *or* 2 *or* 3 *or* 4)

c) The number of the axes of symmetry of an equilateral triangle is ....

(1 *or* 2 *or* 3 *or* 4)

d) The image of the point $(-2, 3)$ by translation 3 units in the negative direction of Y-axis is .... $((-2, 0)$ *or* $(-5, 3)$ *or* $(-2, 6)$ *or* $(-3, 0))$

e) The image of the point $(3, -5)$ by translation 4 units in the negative direction of X-axis and 4 units in the positive direction of Y-axis is ....

$((7, -1)$ *or* $(7, -9)$ *or* $(-1, -9)$ *or* $(-1, -1))$

f) 📖 The image of the point $(-1, 2)$ by translation 3 units in the positive direction of x-axis is .... $((-1, 5)$ *or* $(2, 2)$ *or* $(-2, 2)$ *or* $(-1, 3))$

g) 📖 The image of the point $(-3, 4)$ by translation 4 units in the negative direction of Y-axis is .... $((-3, 0)$ *or* $(-7, 4)$ *or* $(-3, 8)$ *or* $(-1, 4))$

h) 📖 The image of the point $(3, 5)$ by translation $(x + 2, y - 1)$ is ....

$((5, 6)$ *or* $(5, 4)$ *or* $(1, 4)$ *or* $(1, 6))$

i) 📖 The image of the point $(8, -10)$ by translation $(-3, 4)$ is ....

$((5, -6)$ *or* $(5, -14)$ *or* $(11, -6)$ *or* $(11, -14))$

j) 📖 The image of the point $(\ldots, \ldots)$ by translation $(x - 3, y + 4)$ is $(-5, -3)$

$((-8, 15)$ *or* $(-2, 7)$ *or* $(-8, 7)$ *or* $(-2, -7))$

k) 📖 The image of the point $(1, -3)$ by translation $(\ldots, \ldots)$ is $(1, 0)$

$((1, 0)$ *or* $(0, 0)$ *or* $(3, 0)$ *or* $(0, 3))$

l) The image of the point A $(3, -4)$ by translation $(x + 1, y + 4)$ is ....

$((4, 0)$ *or* $(4, 8)$ *or* $(3, 8)$ *or* $(3, 0))$

6 **Complete the following:**

a) The image of the point A (3 , 1) by translation (−1 , 3) is (...... , ...).

b) The image of the point B (3 , 5) by translation $(x + 2 , y − 1)$ is (...... , ...). *(Giza 2019)*

c) The image of the point A (1 , 2) by translation $(x + 1 , y − 1)$ is (...... , ...).

d) The image of the point A (4 , 5) by translation (− 2 , 1) is (...... , ...). *(Aswan 2013)*

e) The image of the point (...... , ...) by translation (2 , 1) is (3 , 5).

f) The image of the point (...... , ...) by translation $(x + 3 , y − 1)$ is (0 , 0).

g) The image of the point (− 2 , 6) by translation (...... , ...) is (5 , 2).

h) If the image of the point (a , b) , is (5 , − 4) by translation (2 , − 3), then the coordinates of the point (a , b) = ...

i) The image of the point A (2 , 5) by translation $(x + 1 , y − 2)$ is ...... *(Giza 2016)*

j) The image of the point B (2 , 5) by translation 4 units in the negative direction of X-axis is ......

7 If the image of the point (a , b) by translation (3 , − 2) is (− 4 , 5),

find (a , b). *(Alexandria 2015)*

8 **Find** the coordinates of the point A if its image by the translation (1 , − 5) is À (2 , 0).

9 **From the opposite figure:**

a) Determine the coordinates of the following points:

A (...... , ...), B (...... , ...) and C (...... , ...)

b) Find the image of △ ABC by translation $(x + 2 , y + 3)$.

c) The length of $\overline{BC}$ = ... and the length of $\overline{AB}$ = ...

d) Is the triangle ABC symmetric or not? Why?
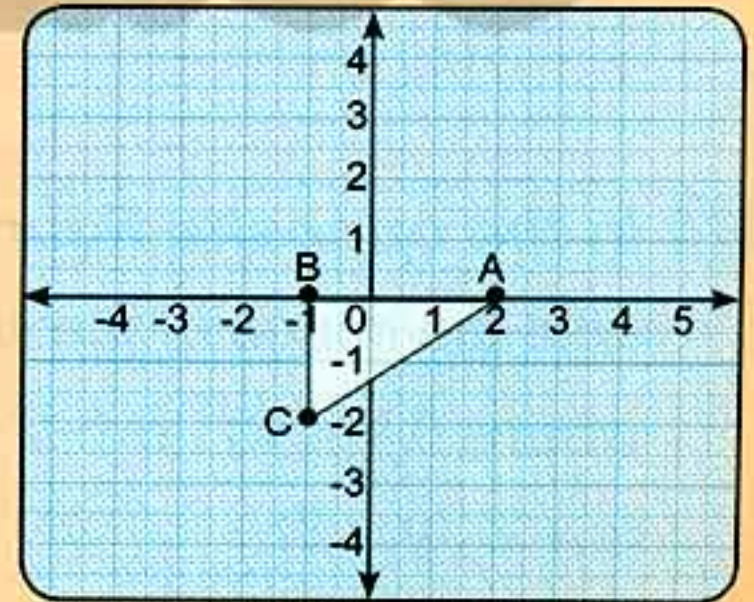
10 **In the coordinate plane:**

find the image of triangle
ABC by translation $(x - 2 , y - 3)$.
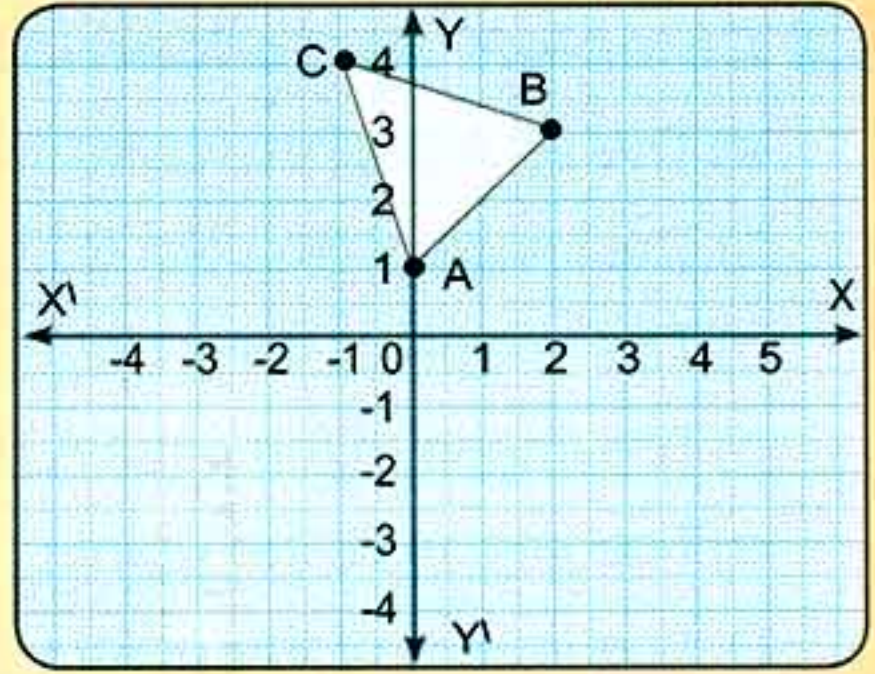
11 **In the coordinate plane:**

determine the image of triangle ABC
by translation $(x + 3 , y)$.
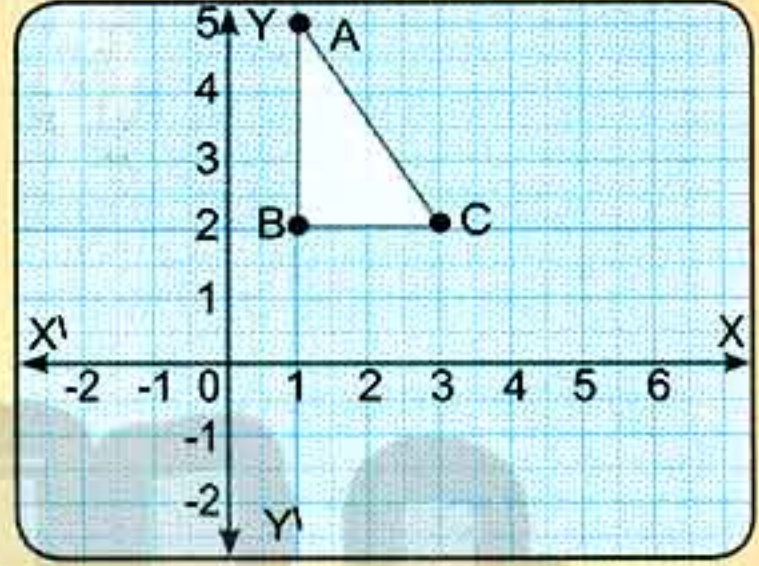
12 **Draw on a square lattice:**

find the image by of triangle ABC by
the $(5 , 0)$ on the graph.
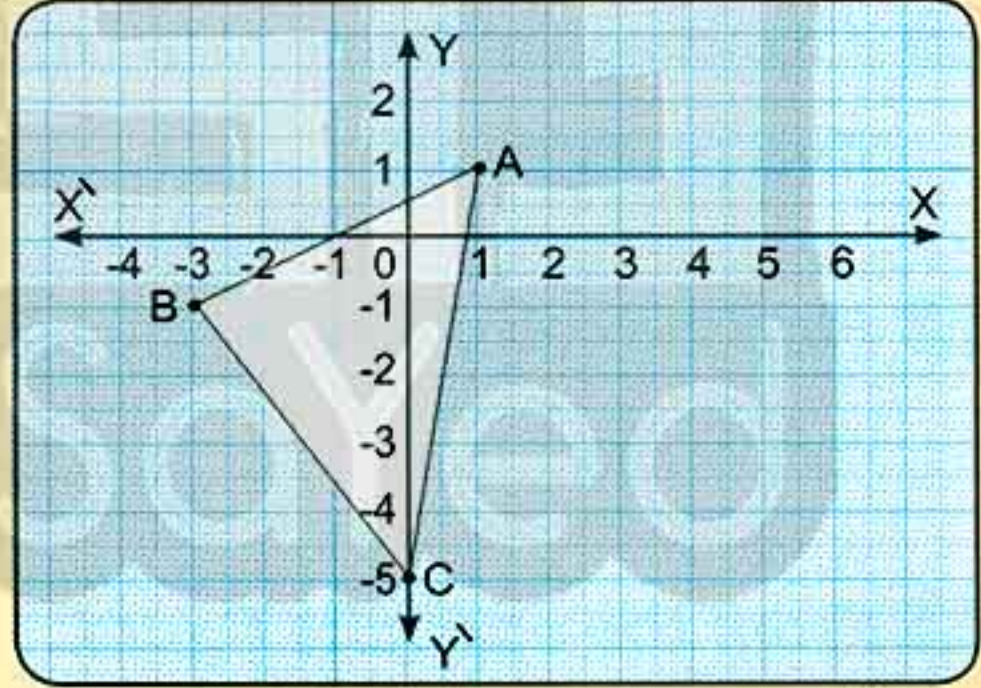
13 **In the opposite figure:**

Find the image of the line segment $\overline{AB}$,
where A $(1 , 2)$, B $(- 2 , - 1)$ by translation
$(x + 2 , y - 2)$.

142
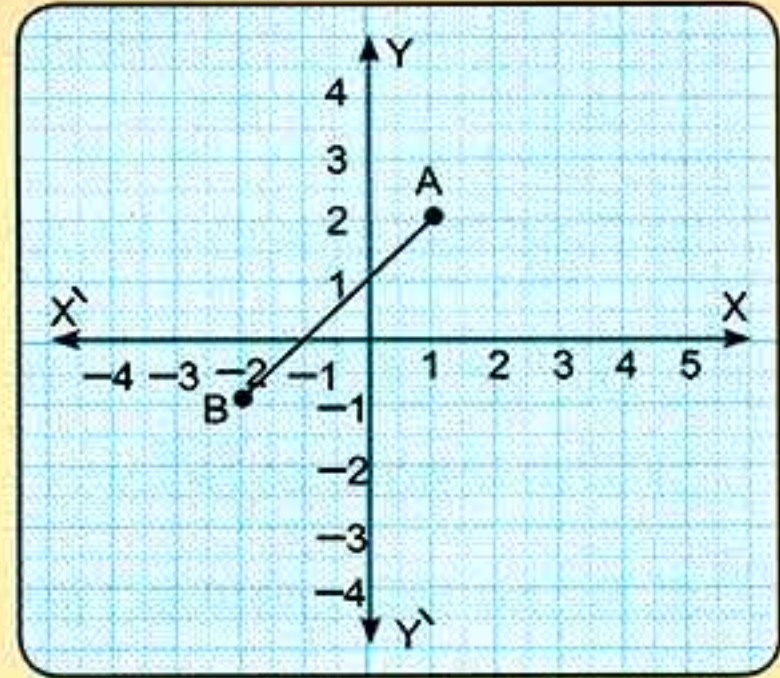
14 In the coordinate plane:

Draw the square LMNO, where L (6 , 0), M (6 , 6), N (0 , 6) and O (0 , 0), then find its image by translation $(x - 3 , y - 4)$.

15 *In the coordinate plane:*

Draw the parallelogram ABCD, where A (−1 , 1), B (− 2 , 3), C (− 8 , 3) and D (− 7 , 1), then find its image by translation $(x + 4 , y - 2)$.

16 *In the coordinate plane:*

Draw the rectangle ABCD, where A (−4 , − 3), B (−4 , 0), C (2 , 0) and D (2 , − 3), then find its image by translation $(x , y + 3)$.

17 *Determine the following points on the coordinate plane:*

A (5 , 1), B (5 , 4), C (1 , 4) and D (1 , 1), then find:

a) The lengths of $\overline{AB}$, $\overline{CD}$, $\overline{AD}$ and $\overline{BC}$.

b) The perimeter of the shape ABCD.   c) The area of the shape ABCD.

d) The image of the shape ABCD by translation (AD) in the direction of $\overrightarrow{AD}$.

18 📖 *In the opposite figure:*

Determine the image of $\overline{DE}$ where:

D (2 , 0), E (−1 , 1) by translation $(x + 3 , y + 2)$

What is the name of the shape DD̀È E? Why?
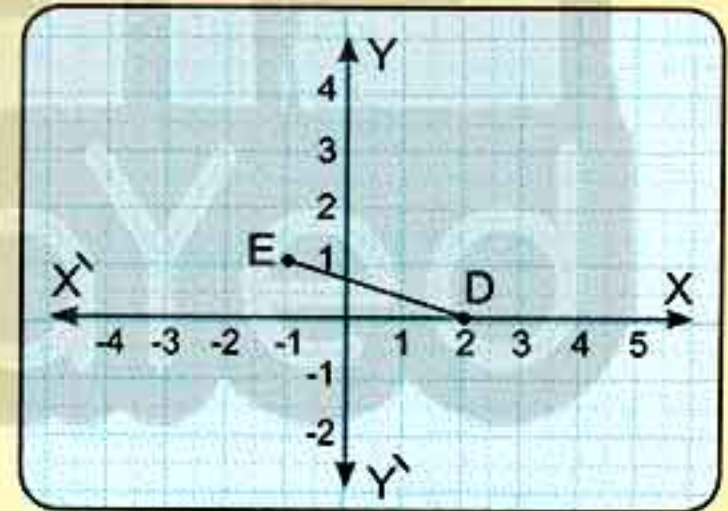
19 📖 *Using the coordinate plane, determine:*

The image of the quadrilateral ABCD by translation (3 , − 4).

143
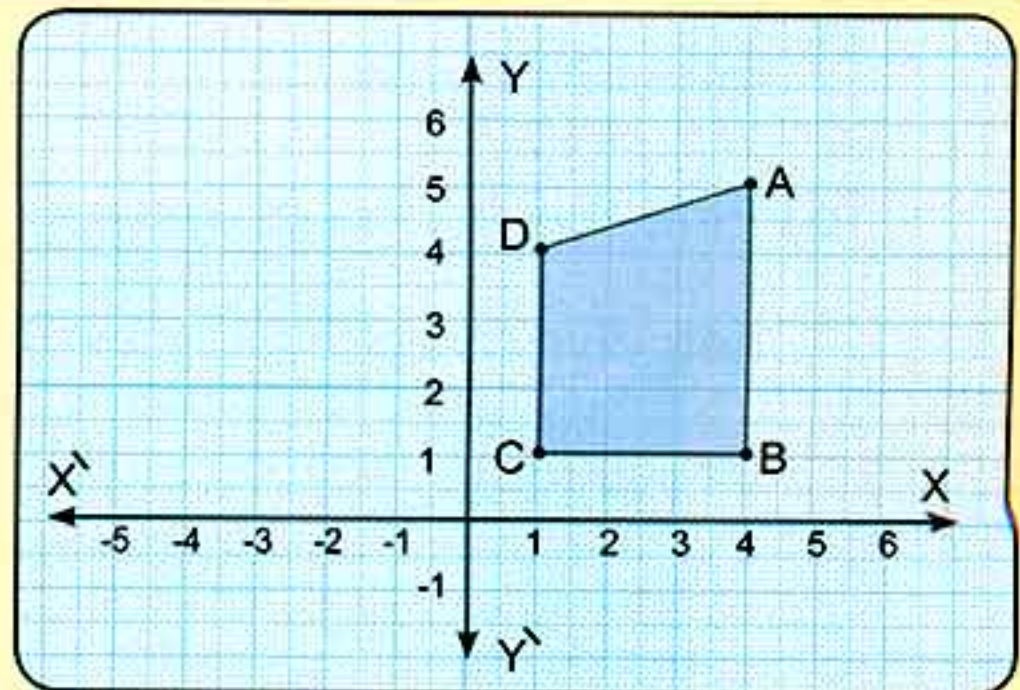
20 Determine the image of the shape:

ABCD where A (5 , 1), B (2 , 1), C (5 , 4) and D (2 , 4) by translation: two steps

down, one step left and followed by two steps down.

21 📖 *On a square lattice, find the image of the rectangle:*

ABCD in which A (4 , 1), B (4 , 3), C (1 , 3) and D (1 , 1)

by translation $(x + 3 , y + 3)$.

22 *Determine the points:*

A (− 3 , 4), B (1 , 4) and C (1 , 2) on the coordinate plane, then find:

a) AB = ... , BC = ...

b) The image of △ ABC by translation (0 , − 3).

23 📖 a) If the image of the point (A , B) by the translation (2 , − 3) is (5 , − 4)

find (A , B).

b) If the image of the point (x , y) by the translation (3 , − 2) is the point

(− 4 , 5), find the coordinates of the point (x , y).

c) If the image of the point (4 , 5) is (2 , 5) by translation, then write the

translation rule.

d) Find the image of the point (− 3 , 4) by the translation 4 units in the

negative direction of y-axis, then by the translation 3 units in the positive

direction of x-axis.

Cumulative Exercise

24 Represent the points A (2 , 3), B (4 , – 2) , C (– 2 , – 2) , D (– 4 , 3),
E (– 4 , – 2) on the coordinate plane, then find:

a) The lengths of $\overline{AD}$, $\overline{DE}$, and $\overline{BC}$.

b) The area of the figure ABCD.

c) The area of the △ DEC.

d) The image of the figure ABCD by the translation (2 , – 2).

---

25 If $\overline{A\acute{B}}$ is the image of $\overline{AB}$ by translation (– 6 , 0) where A(4 , 5), B(4 , 2)
Find the following:

1) The length of $\overline{A\acute{A}}$.

2) The length of $\overline{B\acute{B}}$.

3) The name of the figure A$\acute{A}$ B$\acute{B}$ is it symmetric or not?

🏆 Think and Explore

26 If △ XYZ is the image of △ ABC by the translation (a + 1 , b – 1)
Find the value of a , b if X (–1 , 2) and A (3 , 0).

....

....

....

Unit (1)

Worksheet 1 ▶ on Lesson (1) - Unit (1)   **Total mark** 25

1 **Choose the correct answer:** 5

a) $\left| \frac{1}{3} \right| - \left| \frac{-1}{3} \right|$ .... $\mathbb{Z}$ ($\in$ or $\notin$ or $\subset$ or $\not\subset$)

b) If $x = |-5|$, then $x =$ ....   (-5 or 5 or 0 or 10)

c) $\mathbb{Z}^+ \cap \mathbb{Z}^- =$ ....   ($\mathbb{Z}$ or $\mathbb{Z}^+$ or $\mathbb{Z}^-$ or $\varnothing$)

d) $\mathbb{N} \cup \mathbb{Z} =$ ....   ($\mathbb{Z}$ or $\mathbb{N}$ or $\mathbb{Z}^-$ or $\mathbb{Z}^+$)

e) $\mathbb{Z}^+ - \mathbb{Z}^- =$ ....   ($\mathbb{Z}^+$ or $\varnothing$ or $\mathbb{N}$ or $\{0\}$)

2 **Complete each of the following:** 5

a) The complement of $\mathbb{Z}^-$ with respect to $\mathbb{Z}$ is ....

b) $|-3| + |-2| =$ ....

c) $\{15\}$ .... $\mathbb{Z}^-$

d) If $X \subset \{2, -3\} \cap \{5, -3\}$, then $X =$ .... or ....

e) $\frac{|-6| + 2}{2} =$

3 **Represent each of the following on the number line:** 5

a) $-3, 0, 2, 1, -6, 5$

b) $6, -3, 0, -1, 3, 5$

4 **Find each of the following:** 5

a) $|-4| \times |7|$ b) $|-30| \div |-5|$

5 **Find the value of x to get a true statement:** 5

a) $-5 \in \{-1, 0, -3, x\}$

b) $|-7| \notin \{x, -7, 3\}$

Worksheet 2 ➤ *Till Lesson (2) - Unit (1)*   **Total mark** / 25

1 **Complete each of the following:**   / 5

a) The previous integer and the next integer of - 40 are .... and ....

b) If $x = |-7|$, then $x = $ ....

c) If $|x| = 15$, then $x = $ .... or ....

d) $3 + |-3|$ .... $|-10|$ (Put < *or* > *or* =)

e) $|-3| - |-5| + 2 = $ ....

2 **Choose the correct answer:**   / 5

a) $\mathbb{Z} - \mathbb{N} = $ ....   ($\mathbb{Z}^-$ *or* $\{0\}$ *or* $\mathbb{Z}^+$ *or* 0)

b) The smallest positive integer is ....   (1 *or* -1 *or* $\varnothing$ *or* zero)

c) The number of integers between -2 and 4 is ....   (3 *or* 4 *or* 5 *or* 6)

d) $|-9| + 3$ .... $\mathbb{Z}$ ($\in$ *or* $\notin$ *or* $\subset$ *or* $\not\subset$)

e) If $a \in \{2, -5, -3\} \cap \{-2, 5, -3\}$, then $a = $ ....   (-5 *or* -3 *or* 20 *or* 3)

3 **Arrange each of the following in descending order:**   / 5

(1) $|-2|$, 3, 4, -2 and zero

(2) -3, zero, $|-2|$, 5 and $|-7|$

4 **Represent the following sets on the number line:**   / 5

(1) The set of integers less than 4

(2) The set of integers greater than -3 and less than 4

5 **Find the value of x in each of the following:**   / 5

(1) $|-2| + |3| = x$

(2) $|x| = 3 + |-5|$

Worksheets & Exams

Worksheet 3   >> Till Lesson (3) - Unit (1)   Total mark $\frac{........}{25}$

1 **Complete each of the following:** $\frac{........}{3}$

a) $8 + (-11) =$ ....

b) $(-7) + (-4)$ ....

c) The greatest negative integer = ...

d) $-|7| + |-5| =$ ....

e) $23 - (-13) =$ ....

f) The set of odd integers $\cup$ the set of even integers = ...

2 **Choose the correct answer:** $\frac{........}{3}$

a) $\left| \frac{7-11}{2} \right| =$ ....   (1 or 0 or 2 or −2)

b) $-4 - (-6)$ 0   (> or < or = or ≤)

c) $\mathbb{Z}^+ \cap \mathbb{Z}^- =$ ....   ($\varnothing$ or {0} or $\mathbb{Z}$ or $\mathbb{Z} - \{0\}$)

d) $\mathbb{Z} - \mathbb{Z}^- =$ ....   ($\mathbb{Z}^-$ or $\mathbb{Z}^+$ or $\mathbb{N}$ or {0})

e) $|-5| +$ .... = zero   (−5 or 5 or Zero or 1)

f) If $a = 3$, $b = -7$, then the value $a + b =$ ....   (3 or 4 or −4 or 5)

3 **a) Use the properties of addition in $\mathbb{Z}$ to get the result of the following:** $\frac{........}{7}$

(1) $(-240) + 34 + 140$

(2) $1035 + 75 + (-1000)$

b) **Check the closure property in addition and subtraction on the set X = {−2, 0, 2}**

4 **a) Complete each of the following:** $\frac{........}{6}$

(1) The additive inverse of 7 is ....   (2) The additive identity element in $\mathbb{Z}$ is.......

b) If $a = 4$, $b = -2$ and $c = -5$, **find:**

(1) $a - (b - c)$ (2) $(b + c) - a$

5 **Use the number line to find the sum of each of the following:** $\frac{........}{6}$

a) $3 + 2$ b) $(-3) + 4$ c) $3 + (-7)$

6   GEM / MATH / Primary 5

Worksheet 4   **Till Lesson (4) - Unit (1)**   **Total mark** $\frac{\cdots}{25}$

1 **Choose the correct answer:** $\frac{\cdots}{3}$

a) $-|9| + |-3| =$ ....   (–3 or –9 or –6 or 6)

b) $-8 \div (-4) =$ ....   (2 or 4 or –2 or zero)

c) The additive inverse of the number $|-3| =$ ....   (3 or –3 or 6 or zero)

d) $-7 \times -9 =$ ....   (63 or –2 or –72 or 72)

e) $7 \times (6 + (-3)) =$ ....   (–1 or 16 or 10 or 21)

f) If $a \in \{-2, -5, -3\} - \{-2, 5, -3\}$, then $a =$ ....   (–5 or –3 or 2 or 3)

2 **Complete the following:** $\frac{\cdots}{5}$

a) $\mathbb{Z} \cup \{0\} =$ ....

b) $|-36| \div |-4| =$ ....

c) If $x \times (-5) = 45$, then $x =$ ....

d) $(35 \div 5) \div (-7) =$ ....

e) $5 \times (-3 + 7) =$ ....

3 **a) Find the numerical value of:** $\frac{\cdots}{5}$

$\quad 2x + y - Z \qquad$ if $x = 3$, $y = -1$, $Z = -7$

b) Find the result of the following: $(5 + (-3)) \times -11$

4 **Find the result of each of the following:** $\frac{\cdots}{6}$

1) $420 \div (-15)$ 2) $(-1300) \times 2$ 3) $15 \times (-15)$

4) $112 + 75 + (-112)$ 5) $(-144) \div 12$ 6) $(Zero \times 7) \div (-12)$

5 **Find the value of x in each of the following:** $\frac{\cdots}{6}$

a) $x = (-2) \times 5$ b) $3 \times x = -24$

c) $(-48) \div x = (-4)$ d) $5 \times |-7| = 5 \times |x + 1|$

e) $-4x = 36$ f) $x \times (7 \times 8) = [(-9) \times 7] \times 8$

GEM / MATH / Primary 5   (7)

Unit (3)

Worksheet 10 ▶ On Lesson (1) - Unit (3) | **Total mark** (25)

1 *In the opposite coordinate plane: complete:* (5)

a) A (······ , ······) , B (······ , ······) ,

 C (······ , ······)

b) The length of $\overline{BC}$ = ·················· .

c) The length of $\overline{BA}$ = ·················· .

d) The type of the triangle ABC with

 respect to its angles is ··················
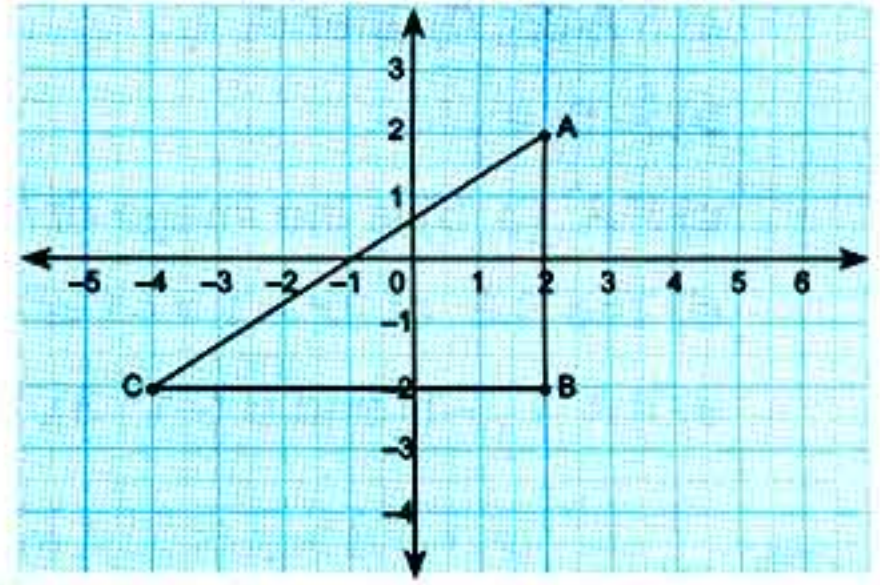
2 *In the opposite figure: complete:* (4)

a) A (······ , ······) , B (······ , ······) ,

 C (······ , ······) , D (······ , ······)

b) The length of $\overline{AC}$ = ··················

c) The length of $\overline{BD}$ = ··················

d) The surface area of the figure ABCD = ··················
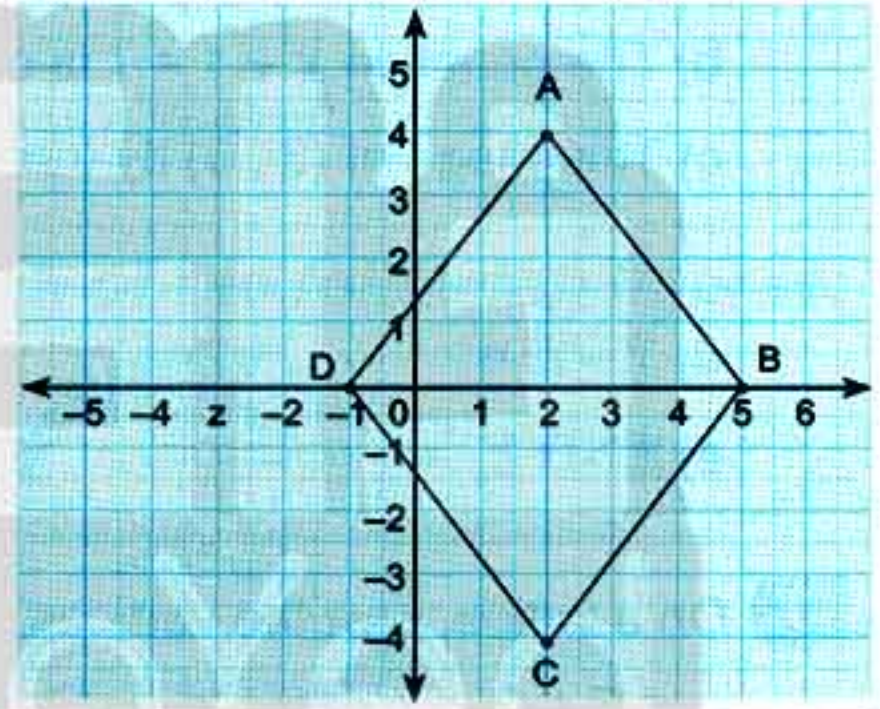
3 a) **Find** the S.S. of $3x + 2 = x + 18$ in $\mathbb{Z}$. (6)

b) **Use the properties of addition in $\mathbb{Z}$ to find the result of**

 $112 \times 17 + 112 \times (-17)$. **(State the property that you use.)**

4 a) If $x = 8$, $y = -2$, **find the value** of $x - 2y + 4$ (6)

b) **Arrange in ascending order:** 3 , -30 , $|-30|$, zero and -3×3

c) **Find** the solution set of $2x - 5 \le 7$ in $\mathbb{Z}$.

5 On the coordinate plane, determine the points A (5, 1), B (5, –3), C (–3, –3) and (4)

 D (–3 , 1), then **find**:

1) The length of $\overline{AB}$ and $\overline{AD}$. 2) The surface area and the perimeter of ABCD.

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Worksheet 11 ► **Till Lesson (2) - Unit (3)**   **Total mark** ⌀ 25

1 *Complete the following:* ⌀ 5

a) If A (2 , 0), then A` (.... , ...) is its image by translation (2 , 3).

b) $|-5|$ = ...

c) If A` (3, 5) is the image of A by translation (2,1), then the coordinate of A is (···· , ····).

d) The S.S. of $2x - 1 = -1$ is .... if the substitution set is {0 , 1 , 2 , 3}

e) If A (1 , −1) and B (−1 , 3), then the translation that makes B the image of A is ··········

2 *Choose the correct answer:* ⌀ 5

a) The image of the point A (5 , 3) by translation (−4 , 1) is ....

((1 , 4) *or* (−1 , −4) *or* (3 , 2))

b) The equation $x + 1 = 7$ is of the .... degree.   (1ˢᵗ *or* 2ⁿᵈ *or* 3ʳᵈ *or* 4ᵗʰ)

c) The image of (3 , 3) by translation $(x + 2 , y - 1)$ is ....

((−2 , 5) *or* (2 , 5) *or* (−5 , 2) *or* (5 , 2))

d) $\mathbb{Z} - \mathbb{N}$ = ...   ($\mathbb{Z}^-$ *or* {0} , $\mathbb{Z}^+$ *or* zero)

e) $\mathbb{Z}^+ \cap \mathbb{Z}^-$ = ...   ($\mathbb{Z}^+$ *or* $\mathbb{N}$ *or* $\varnothing$ *or* {0})

3 On a lattice, **plot** the vertices of the triangle ABC where A (1 , 2) , B (−2 , 2) and C (−2 , −4), then **draw** its image by translation $(x + 3 , y - 1)$. ⌀ 4

4 On the coordinate plane, determine A (2 , 3) , B (4 , −2) , C (−2 , −2), D (− 4 , 3), and E (− 4 , − 2), *then find:* ⌀ 6

a) The length of $\overline{AD}$, $\overline{DE}$ and $\overline{BC}$.

b) The surface area of the shape ABCD and the surface area of $\triangle$ DEC.

c) The image of ABCD by translation (2 , −2).

5 a) Find the value of $\dfrac{(-3)^5 \times (-3)^2}{(-3)^3}$ ⌀ 5

b) Ahmed decided to lose weight at the rate of 4 kg monthly. If he weighs 80 kg right now, then how many months does he need to reach 56 kg? Write the rule expressing this numerical pattern and describe it.

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